Phase 1 Geoenvironmental Desk Study

Northfleet,

Kent, DA11 9AD

for

Hyro Energy Ltd

G-22-049

May 2023

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Executive Summary

Site Description	The site is 560m long (N-S) and 215m wide (E-W) maximum dimensions of c. 10.1ha area, within the existing Kimberley Clark paper mill facility, located in Northfleet on the south bank of the River Thames, Kent. It is understood that the proposed development will comprise a hydrogen gas production plant, Green Hydrogen 3.
Site History	• The site formerly comprised a chalk quarry which by the mid 19th Century was occupied by residential houses and gardens, tramway and earthworks embankments, wharf, iron foundry, brickworks and limekilns until the 1950s. Since the 1960s the site has been occupied by a paper mill with associated storage tanks, effluent treatment plant and boiler house (currently gas oil fired). • The adjacent land has been occupied by a dockyard and wharf, chalk quarry, limekilns, paper mill, power station and cement works.
Geology	• Superficial drift: BGS records including historic borehole records indicate superficial deposits to underlie the site, primarily comprising made ground, with potential alluvial deposits below the northern boundary adjacent to the River Thames. • Solid geology: Chalk strata at shallow depth. • No geologic faults recorded on site. • The majority of the site lies within an area with very low risk of ground dissolution of soluble rock apart from the southern boundary which is at low risk.
Environmental	• The site lies 40m south of the River Thames adjacent to a jetty. • Superficial deposits below the northern boundary comprise a Secondary Undifferentiated aquifer of high groundwater vulnerability. • Bedrock comprises a Principal Aquifer of high groundwater vulnerability. • No Nitrate Vulnerable Zones within 2000m. • 1 No. licensed surface water abstraction within 2000m, 865m NW. • 15 No. licensed groundwater abstractions within 500m. 2 No. on site relating to boiler feed supply. • Within Source Protection Zones from 1 to 3. • No discharge consents relate to the site and 10 No. within 250m. • 1 No. pollution incidents on site dated 2003 relating to firefighting run-off. 2 No. 31m NE dated 2006 relating to inert wastes.
Flooding	• Site is designated to be at very low risk of tidal flooding. • The main site area lies within a Flood Zone 2 and northern perimeter Flood Zone 3.

	• High risk of surface water flooding. • Moderate to high risk of groundwater flooding
Contamination	• Various previous contaminative land uses have been identified on site and adjacent to the site which present potentially contaminative processes and are considered to present a moderate to high risk of potential mobile contaminants to the site.
Ground Gas	• Low risk of ground gas generation. • No radon protective measures are required for buildings in this area
Drainage	• The site is underlain by variable made ground directly overlying the Chalk bedrock which is classified as a Principal Aquifer with an anticipated shallow water table, therefore, it is unlikely that soakaway drainage systems will be suitable.
Recommendations for Ground Investigation	Targeted ground investigation to include: • Exploratory holes to allow for in-situ testing and soil sampling, to assess shallow ground conditions for the installation and proposed route of supply pipelines and cabling and prove the presence or not of buried obstructions. • Installation of gas/groundwater monitoring standpipes if occupied fixed buildings with confined spaces are proposed. • Geotechnical and chemical laboratory testing of soils and bedrock for contamination/pollution risk assessment and foundation design. • Gas and groundwater monitoring (if required) – 6 visits over a 3 month period. • Factual and interpretive report.

The executive summary should not be read or used in isolation and reference should be made to the full report which provides a detailed assessment of the risks potentially affecting the development.

1.0 Introduction

1.1 Commission

GVR Geoservices Ltd (GVR Geo) was appointed by Renewable Energy Systems (RES) Ltd on behalf of Hyro Energy Ltd to undertake a Phase 1 Geoenvironmental Desk Study for the proposed development of a hydrogen gas manufacturing plant at the Kimberley Clark paper mill site in Northfleet, Kent, DN11 9AD. The site is on the south bank of the River Thames with a river frontage and an in-river berthing docks. A site location plan is presented as Drawing No. G-22-049-001 in Appendix A**.**

1.2 Proposals

It is understood that the Hyro Energy Ltd propose to construction a new hydrogen gas production facility at the site, including hydrogen electrolysers, substations, hydrogen storage tanks and supply connection pipelines, together with office and equipment containers. In addition, at some point in the future (not under consideration here) a new dual fuel hydrogen and natural gas fired boiler is to be installed to replace the existing natural gas fired boiler, initially running in tandem during commissioning. The proposed layout of the hydrogen facility is shown on RES Drawing No. 05135-RES-PRO-DR-PE-001 Rev. 3 in Appendix A. Much of the new proposed construction is to be containerised plant brought onto site and set up on prepared hardstanding but includes new underground infrastructure (e.g. cabling routes and surface water drainage measures) for the proposed development.

This report is required to support the planning application for the proposed development and to inform the works of potential land contamination and remedial actions to facilitate the construction works.

1.3 Objectives

The objectives of this report are as follows:

- Conduct a site walkover survey of the land to look for evidence of potential land contamination.
- Assess the land use history and whether the former site use may have given rise to significant ground contamination that could affect the development.
- Provide information on the ground and groundwater conditions, including the potential for surface or underground natural cavities or dissolution features.
- Describe the environmental setting of the site and status of environmental receptors.
- Assess the potential for hazardous ground gas to affect the proposed end use.
- Present the results of a detailed Unexploded Ordnance (UXO) risk assessment.
- Provide a conceptual site model on which to base a preliminary environmental risk assessment.
- Inform the need for and scope of further assessment works.

This report presents factual information obtained during this appraisal, an interpretation of the data and recommendations with respect to the proposed development.

1.4 Sources of Information

The study includes a review of the following information sources:

1. Groundsure Insight report which includes but is not restricted to; historical OS maps and land use, geology, hydrogeology, hydrology, environmental receptor search data, past and present landfill and waste management, hazardous substances, industrial land use and sensitive land uses.
2. British Geological Survey (BGS) GeoIndex online search tool.
3. Detailed UXO Risk Assessment Report prepared by 1st Line Defence Ltd, Report Ref: DA11104a-00, dated 19/5/23.

1.5 Limitations

This report has been prepared for Hyro Energy Ltd and their appointed agents only and should not be relied upon by any third party without the written permission of GVR Geo. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill. This report is based on and limited to an assessment of the information and ground conditions identified here. GVR Geo is not responsible for ground conditions not revealed during these investigations.

2.0 Site Setting

Grid Reference	Approx. OSGR 562689, 174568, NGR TQ 627 746
Area	The site comprises a roughly rectangular area of land, up to 560m N-S x up to 215m E-W maximum dimensions with an approximate area of 10.1ha.
Description	The site currently comprises the Kimberley Clark papermill on the south bank of the River Thames, which lies within a former Chalk quarry. The papermill facility comprises a mixture of industrial buildings/warehouses, office buildings, a boiler house and effluent treatment plant, together with various storage tanks, open storage hardstanding areas and access roads. Access is currently gained via Crete Hall Road on the eastern boundary of the site. A site walkover was carried out on 2nd May 2023, selected photographs from which are presented in Appendix E. In addition to the above, the walkover survey has indicated the following: • The proposed hydrogen electrolysis plant is located in the northern area between the boiler house and effluent treatment plant. This part of the site currently comprises a level concrete hardstanding area primarily used for storage of materials (paper). • Adjacent to the west of the boiler house are 3 No. sunken former storage tank bases with adjacent signage indicating the tanks were used for the gas oil. A summary of the chemicals currently stored on site is provided in the table below.
Adjacent Land Use	The adjacent land comprises a wharf and jetty to the north with the River Thames beyond. To the south is a near vertical Chalk quarry highwall with a narrow strip of land between the site and the base of the highwall used as an HGV parking area. The land at the top of the Chalk highwall extending south away from the site comprises the B2175 London Road with predominantly residential development beyond. The land to the east is occupied by light industrial buildings and logistics warehousing and area of hardstanding for container storage and vehicle parking. To the west is a cement manufacturing works.

Summary of Chemicals Currently Stored On Site (Within the Site Red Line Boundary)

CHEMICAL NAME	MANUFACTURER	DESCRIPTION	STORAGE SIZE	LOCATION
Aluminium Sulphate Solution	Monarch	Aluminium Sulphate	20,000 L	Effluent Treatment Plant
Amercor 8785	Solenis	Corrosion Inhibitor	220 L Drum	Boiler House
Bubond 2681	Buckman	Yankee Coating	IBC	Tissue Machine
Bulab 8862	Buckman	Isothiazaline based RO preservative	IBC	Effluent Treatment Plant
Bulab 8882	Buckman	RO Cleaning Product	IBC	Effluent Treatment Plant
Bulab 8885A	Buckman	RO Cleaning Product	IBC	Effluent Treatment Plant
Ferric Chloride Solution 40%	Monarch	Flocculant	IBC	Effluent Treatment Plant
Phosphoric Acid more than 25%	Monarch	Nutrient for Bioreactor	IBC	Effluent Treatment Plant
SigmaFast 20	Sigma Coatings	Anticorrosive primer	5 L	Workshop
Sigmarine 35	Sigma Coatings	Corrosion resistant paint	5 L	Workshop
Sodium Hypochlorite	Monarch	RO & Sand filter Biocide	15000 L	Effluent Treatment Plant
Spectrum XD1415	Solenis	pH stabilised sodium hypochlorite	IBC	Tissue Machine
Sulphuric Acid 98%	Monarch	Sulphuric Acid	20,000 L	Boiler House

3.0 Geoenvironmental Information

Historical maps are included in Appendix B and environmental data is included in Appendix C.

3.1 Historical Land Use

A brief summary of the land use history of the site is presented below which is intended to only describe the changes that have occurred on or adjacent to the site that are relevant to the objectives of this investigation.

It should be noted that the available mapping and Ordnance Survey records are carried out on a cycle of approximately 20 years, so surface mineral extractions and other short-term disturbance of the site may not have been mapped.

A summary of the land use historical features of the site is shown on Drawing No. G-22-049-002 presented in Appendix A**.**

Map Dates	On-Site	Off-Site
1865	Northern half of the site comprises terraced residential development with back yards and gardens and public houses. The northern edge overlies tidal flats of the River Thames with a wharf in the NW corner. Allotment gardens. A tramway extends across the central and southern area with evidence of earthworks/embankments associated with former chalk quarrying Mound named Collybank located centrally adjacent to western boundary.	Dock adjacent NE corner. Dockyard (incl. engineering shop/smithery and foundry) adjacent E. Chalk quarry adjacent E. Limekilns 20m and 250m E. Wharf 260m NW. Rifle Range 20m S.
1895-1909	Small iron foundry in NE corner. Brickworks across the southern half with possible reservoir structures in SW. Kilns in central area.	Dock to NE corner disused by 1897. Terrace housing in place of limekilns adjacent E. Cement works 80m W (incl. tanks, kilns, tramway, wharf).
1932-1955	Brickworks no longer present.	Dock infilled adjacent E. Dockyard now paper mill adjacent E. Tank 100m W.

Map Dates	On-Site	Off-Site
1966-1992	Significant redevelopment as paper mill with various buildings and ground levelling with hardstandings and travelling cranes, extension of land into the former tidal flats area. Tanks on northern and southern boundaries. Boiler house building N boundary. Collybank mound removed.	Construction of new jetty 10m N into the river. Expansion of paper mill – adjacent E. Works including tanks 130m W. Power station 300m E with possible tanks/cooling towers.
2001-2023	Further changes to paper mill buildings. Tanks SW corner.	Power station 300m E.

3.2 Geology

Presented below is a summary of the geological conditions at the site based on the historic Ordnance Survey map information and online data available on the BGS website. The BGS information includes the records of 4 historic boreholes undertaken within the NE corner of the site in 1972.

Made Ground	In view of the historical land uses on site including earthworks embankments, tramways and more recently construction of the paper mill buildings and hardstandings it is anticipated that surface made ground will be present below the site from ground level. This is expected to be of variable composition and thickness, with more significant thicknesses present in the northern boundary area where the mill hardstandings extend over the former river tidal flats and where potentially deep storage tanks are expected to be present. The presence of "worked ground" is confirmed by one historic borehole record (1972) which indicates made ground with a thickness of up to 2.13m.
Superficial Geology	The BGS GeoIndex online viewer indicates that there are no recorded natural superficial deposits underlying the site. This is likely to be due to the site lying within a former chalk quarry where any superficial deposits would have been removed during extraction of the chalk bedrock. However, Alluvium and River Terrace Deposits could underlie the northern edge of the site adjacent to the River Thames. The presence of alluvium "River Mud" is recorded on one historic borehole record (1972), with a thickness of 3.96m.
Solid Geology	The solid geology is recorded by the BGS to comprise Undifferentiated Chalk. All historic borehole records confirm Chalk underlies the site.
Faults	No geologic faults are recorded on or immediately adjacent to the site.
Quarrying And Mineral Extraction	The site and the adjacent land to the E and W lie within a former chalk quarry where chalk extraction took place primarily up until the mid 19th Century associated with the manufacture of cement and extraction of flint. The edge of the quarry forms a chalk highwall approximately 30m to the S and

	immediately adjacent the SW boundary with a height extending up to 25m above site ground levels. The outlying area to the S, SE and SW has generally been subject to extensive historic chalk quarrying.
Coal Mining	The site does not lie within a Coal Authority defined coal mining reporting area indicating the site is not at risk from historic underground coal extraction activities.

3.3 Hydrology and Hydrogeology

Water Courses	The River Thames is located 40m N of the site with the northern boundary area providing a river wharf.
WFD Surface Water Body Catchment	The site is classified as a coastal catchment (not part of a river water body catchment). Water Body ID 130 – Lower Medway Operational Catchment and Medway Management Catchment.
WFD Surface Water Bodies	River Thames (Thames Middle) Water body ID GB530603911402 recorded 2m N of the site. • Overall rating - Moderate • Chemical rating – Fail • Ecological rating – Moderate • Year - 2019
WFD Groundwater Bodies	The site lies within the North Kent Medway Chalk Aquifer. Water body ID GB40601G500300. • Overall rating - Poor • Chemical rating – Poor • Quantitative – Poor • Year – 2019
Flood Risk	• The site lies within a river and coastal flood plain recorded to be at very low risk of flooding. • The are no recorded historical flood events relating to the site. • There are records of 2 flood defences on site located on the northern boundary associated with the wharf. • The main area of the site lies within a Flood Zone 2 (a 1 in 1000 chance of flooding each year) and the northern perimeter lies within a Flood Zone 3 with a 1 in 200 or greater chance of flooding each year when the presence of flood defences are ignored. • The site is classified as having a high, up to 1 in 30 year, 0.1 – 0.3m risk of surface water flooding. • The site has a variable moderate to high risk of groundwater flooding.

Groundwater Classification	<u>Superficial Geology</u> The nearest superficial aquifer is recorded to be adjacent to the northern site boundary associated with river deposits which are designated as a Secondary Undifferentiated Aquifer. This designation is assigned where it is not possible to attribute category A or B, previously designated as both minor and non-aquifers. <u>Solid Geology</u> The Chalk bedrock strata is classed as a Principal Aquifer.
Groundwater Vulnerability	• Soil/Surface leaching: intermediate vulnerability • Superficial Geology: high vulnerability • Solid Geology: high vulnerability • Soluble Rock Risk: very significant soluble rocks are likely to be present with a moderate possibility of localised subsidence or dissolution-related degradation of bedrock (3% of site at maximum risk).
Groundwater	2 No. licensed groundwater abstractions on site relating to 2 borehole abstractions used for boiler feed supply for Kimberley Clark (borehole names Springhead and Greensands). Current licence expires 31/3/2018 and 31/03/2030. 5 No. groundwater abstractions within 250m; including 68m NE, 118m SE, 121m SE, 177m SE and 224m E all relating to borehole boiler feed supplies to Kimberley Clark, Northfleet. A further 8 No. groundwater abstractions between 456m to 500m from the site. 10 No. Source Protection Zones within 500m. The southern area of the site is within a Source Protection Zone 1, the remaining site lies within both a Zone 2 and 3.
Licensed Surface Water Abstractions	1 No licensed surface water abstraction recorded within 2000m, 865m NW relating to abstraction from River Thames for mineral washing.
Discharge Consents	10 No. licensed discharges to the River Thames within 250m of the site: • 2 No. 37m SW relating to sewage discharges relating to the paper mill, both revoked. • 1 No. 51m N unspecified type - now revoked. • 1 No. 81m N cooling water discharge related to the adjacent cement works – now revoked. • 3 No. 166m NW trade discharges relating to the adjacent cement works. • 2 No. 201m NW cooling water discharges relating to the nearby cement works, both revoked.

Pollution Incidents	16 No. within 500m of the site: • 1 No. on site dated 2003 relating to firefighting run-off and classified a minor impact to water, land or air. • 2 No. 31m NE both dated 2006 relating biodegradable materials and inert wastes classified as no impact to water and significant impact to land and air. All other incidents do not relate to the site.

3.4 Landfill and Waste Management

Landfill Records	1 No. historic landfill on site (BGS source, No. 1947) relating to Northfleet Power Station. 1 No. 426m SE, relating to Northfleet Power Station including inert, industrial and liquid wastes, last recorded 1992. 1 No. 440m S, Kent County Council, Springhead Road landfill allowing inert, industrial, commercial and household waste, dated 1984. 1 No. 448m SE, relating to Northfleet Power Station allowing inert, industrial and liquid sludge waste, dated 1992. 1 No. 465m S, a refuse tip dated 1971. 1 No. 473m S, a refuse tip dated 1971.
Other Waste Transfer, Treatment or Disposal	5 No. within 500m of the site. 4 No. 302m NW, all relating to Northfleet temporary inert waste transfer facility relating to non-biodegradable wastes. 1 No. 365m E, Red Lion Wharf.

3.5 Industrial Land-use, Environmental Licences, Permits and Registers

Recent/current Industrial Land Use	There are 37 No. recorded recent industrial land uses with 250m of the site. 10 No. are recorded on site and relate to 8 No. storage tanks, an electricity sub station and an industrial engineering business. 11 No. of the recorded recent land uses between the site and 100m include: • Tank 5m SW. • Pylon 38m NE. • Travelling cranes 42m N and 96m NE. • Electrical and electronic engineering business 43m SW. • 3 No. electricity substations 63m E, 69m E and &3m S. • Vehicle repair services 77m SW. • Wharf 83m NE. • Cutting, drilling and welding services 88m S. Beyond 100m of the site a further 16 No. recent/current land uses include; substations, pylons, masts, chalk pits and light industrial businesses.
Recent/current Petrol Stations	None recorded within 500m
Part 2A Designated Contaminated Land	None recorded within 500m
COMAH/Regulated Explosive Sites	None recorded within 500m
Historical IPC Authorisations	2 No. recorded within 500m, both 207m E relating to paper and pulp manufacturing processes by Kimberly Clark.
Part A (1) and IPPC Authorised Activities	13 No. recorded within 500m, including 3 No. permits for site with 2 No. relating to the disposal of non-hazardous waste involving biological treatment and 1 No. relating to the combustion of fuel. 9 No. 199m E and 207m E relating to paper/board producing processes, combustion of fuel and biological treatments operated by Kimberly Clark. 274m NW production of cement clinker.
Part A(2)/B Licensed polluted release	2 No. within 500m: • 74m W cement permit. • 291m E quarry processes.
Red List Discharge Consents (potentially harmful discharges to controlled waters)	None recorded within 500m

List 1 and List 2 Dangerous Substances Inventory Sites	5 No. List 1 with 500m. • 51m N mercury, cadmium and pentachlorophenol – Kimberley Clark. • 3 No. 142m NW cement, mercury and cadmium. • 314m W cadmium – Blue Circle Cement. 1 No. List 2 within 500m. • 51m N atrazine and simazine, organotin – Kimberley Clark.

3.6 Radon

The Groundsure report assesses radon risk using data supplied by Public Health England along with BRE Document 'BR 211 - Radon: Guidance on the Protective Measures for New Dwellings' which indicates that the site partly lies within an area where less than 1% of properties are above the action level. On this basis, no radon protective measures are currently required.

3.7 Environmental Receptors

Designated Sites: SSSI, RAMSAR, SAC, SPA, NNR, LNR etc.	7 No. SSSIs within 2000m all relating to the Swanscombe Peninsula 1103 – 1966m W.
Other Relevant Environmental Receptors	2 No. designated Green Belts within 2000m, including areas in Dartford 1766m SW and Gravesham 1974m S.

3.8 Unexploded Ordnance (UXO)

A detailed UXO risk assessment report was commissioned by GVR Geo and undertaken by specialist subconsultants 1st Line Defence to assess the probability of encountering explosive ordnance during the proposed redevelopment of the site using various available national archives and records. In summary, the report indicates the site to be of Low to Medium risk. The paper mill immediately east suffered several bomb strikes in WWII. On this basis, the report recommends that a UXO Risk Management Plan is undertaken prior to any future intrusive ground works taking place and that any staff involved in such works should receive UXO awareness briefings. The 1st Line Deference Report is presented in Appendix D.

4.0 Conceptual Site Model

4.1 Background

This assessment is designed to meet the requirements for preliminary environmental risk assessment as detailed within the 'Land contamination: risk management' (Environment Agency, 2020) and 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (R&D Publication 66: 2008). The latter guidance is particularly focussed on the development of housing on land affected by contamination. However, the advice is generally applicable to other forms of development and to sites where no development is proposed.

Risk to human health or environmental receptors is based on an assessment of one or more source-pathway-receptor linkages. The contaminant 'source' is any substance which has the potential to cause significant harm to a relevant receptor and the 'pathway' is any route by which the contaminant may travel to impact on a 'receptor'.

The Conceptual Site Model (CSM) summarises the principal contaminant sources, pathways and receptors for this site and the likelihood of the existence of a plausible contaminant linkage. The assessment is based on the proposed end use of 'commercial'.

4.2 Contaminants of Concern

The site history, as a chalk quarry, wharf, iron foundry, embankments, tramways, brickworks and paper mill present potentially significant contaminative land uses. The adjacent land to the east presents a similar contaminative land use and to the west a cement works. Based on these historic land uses the following contaminants of concern may be anticipated:

- Polyaromatic hydrocarbons (PAH), heavy metals, water soluble sulphates.
- Mineral oils and total petroleum hydrocarbons (TPH).
- Phenols and polychlorinated Biphenyls (PCB).
- Asbestos containing materials (ACM).

4.3 Ground Gas Risk

There is a low to moderate risk of significant ground gas generation from made ground soils and organic alluvium on site and the adjacent land to present a risk to the proposed development and end users, especially where development includes confined spaces.

4.4 Phase 1 CSM and Preliminary Environmental Risk Assessment

The significance of the potential source-pathway-receptor linkages identified in the CSM is assessed using the following criteria:

Low Risk
Not likely to cause significant harm to human health or controlled waters. Remedial measures are unlikely to be required.

Moderate Risk
Possible significant harm to human health or controlled waters could occur depending on site specific circumstances. Remedial measures may be required.

High Risk
It is likely that significant harm to human health or controlled waters will occur unless appropriate remedial measures are incorporated into the development.

Conceptual Site Model and Preliminary Environmental Risk Assessment

Source	Pathway	Receptor	Contaminant Linkage: Assessed Risk
Human Health			
Potential contaminants within the made ground/alluvium on site: PAHs, mineral oil and TPH, heavy metals, phenols, PCBs, water soluble sulphates and asbestos.	Direct contact and ingestion/inhalation of contaminated soil and dust	Construction workers	**Moderate to High** Mitigated by controlled removal of any proven contaminants prior to construction and use of appropriate PPE and good site hygiene practice during construction.
	Direct contact and ingestion/inhalation of contaminated soil and dust	End users	**Moderate** Mitigated by the provision of an effective ground surface barrier. No further mitigation anticipated.
Off-site sources of soil or groundwater contaminants	Migration of contaminants in the adjacent land via leaching and surface water run-off or groundwater migration on to site and ingestion/inhalation of contaminated soils.	End users	**Low to Moderate** Mitigated by the provision of an effective ground surface barrier. No further mitigation anticipated.
Ground gas migration from infilled ground on site or adjacent land.	Migration through permeable natural strata and made ground and accumulation in confined spaces and inhalation	End users	**Low to Moderate** If present, mitigation could be in the form of gas protection measures if fixed buildings with confined spaces are proposed.

Source	Pathway	Receptor	Contaminant Linkage: Assessed Risk
Controlled Waters			
Contaminants within the made ground or alluvial deposits on site.	Vertical and lateral migration to groundwater.	Secondary Undifferentiated Aquifer (Alluvial Deposits)	**Low to Moderate** There is the potential for leachable contaminants in the made ground overlying the natural superficial deposits below the northern edge of the site to be currently impacting on this minor groundwater body, albeit the water quality will be brackish and therefore not fit for portable supply. If required, mitigation may be required in the form of removal of proven mobile or leachable contamination during construction.
		Principal Aquifer (Chalk strata)	**High** There is the potential for leachable contaminants in the made ground directly overlying the Chalk below the site to be currently impacting on this Principal Aquifer. Mitigation may be required in the form of removal of proven mobile or leachable contamination during construction.
		Surface Waters (River Thames)	**Moderate** There is potential for mobile or leachable contaminants in the made ground to be currently impacting on this sensitive surface water receptor. Mitigation may be required in the form of removal of proven contamination during construction.

5.0 Conclusions and Recommendations

The following assessment should be considered as preliminary until it can be verified by a targeted ground investigation for the proposed development. The investigation will acquire environmental data on the potential contaminants on site and geotechnical data necessary for engineering design.

5.1 Foundation Design and Construction

The depth, strength, density and plasticity of the underlying made ground, any natural superficial deposits and the Chalk bedrock should be determined by sampling and in-situ testing to identify the type and required depth of foundations for the proposed development.

5.2 Contaminants of Concern and Remediation

The presence or not of potential contaminants of concern in the made ground and alluvial deposits should be assessed by targeted investigation, sample analysis and risk assessment to determine if there are identified contaminants that pose a risk of harm to human health/controlled waters/ecosystems. Following this, remediation mitigation measures can be considered, if required.

5.3 Ground Gas

There is a low to moderae risk potential of ground gases on site affecting the proposed development if fixed buildings with confined spaces that are to be occupied are proposed. Therefore, ground gas monitoring should be undertaken to assess this risk, if required. If only portable, containerised, ground-mounted buildings are proposed, then the risk of gas entering such structures with is considerered to be low and no ground gs risk assessment is deemed necessary.

No radon protective measures are required for occupied buildings in this area.

5.4 Drainage

The site comprises an operational paper mill which currently includes surface water drainage. Localised changes to the existing surface water drainage are likely to be required, but as there is likely to be a very shallow water table, soakaway drainage is unlikely to be suitable. Therefore, no assessment of soakaway drainage is proposed.

5.5 Recommendations for Ground Investigation

To establish the environmental risk based on the findings of the CSM, the following ground investigation works are recommended:

- Exploratory holes extending through the made ground, any natural superficial deposits and into the Chalk bedrock, to retrieve samples for chemical testing to determine the presence of potential contaminants of concern. If occupied buildings with confined spaces are proposed, then allow for the installation of gas/groundwater monitoring wells to assess the requirement for gas protection measures.
- Further exploratory holes extending into the made ground to assess shallow ground conditions along the route of proposed supply pipelines and cables, to prove the presence or not of buried obstructions and allow samples to be retrieved for chemical testing to determine the presence of potential contaminants of concern.

- Geotechnical laboratory testing of soils and bedrock to provide parameters for foundation design.
- Undertake 6 ground gas monitoring visits over a 3 month period, but only if occupied fixed buildings with confined spaces are proposed.
- Factual and interpretive report, providing recommendations for remedial actions as required to allow the safe development of the site and recommendations for foundations and engineering design.

Appendix A

Drawings

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Job: G-22-049

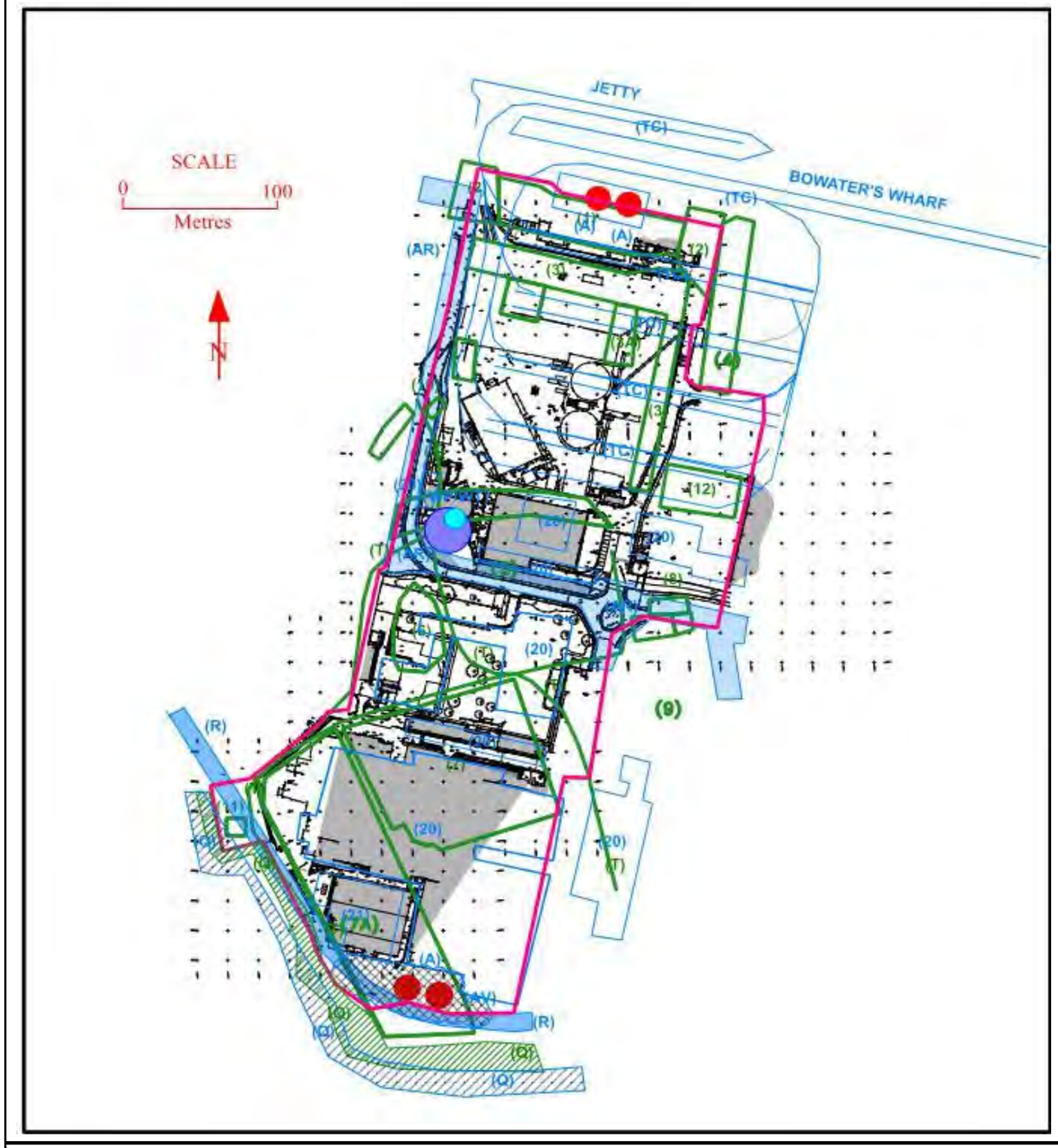
Title: Northfleet, Gravesend, Kent

Client: Hyro Energy Ltd

Scale: NTS

Revision: 0

Drawing Number
G-22-049-001



1863-1955 Site Features (other features added as appropriate with date) – 1907 Survey used

SHOWN IN GREEN

1. River Thames - River Bank / Foreshore
2. River Wharves
3. The Shore & Dock Row – Dwellings, Public Houses and Post Office & 3A Forge (1898)
4. Old Dock – encroaches on boundary
5. Footpath on embankment
6. "Callybank" – Possible chalk waste heap
7. Brickworks Building & 7A. Probable Brickworks Storage
8. Chapel
9. Portland Road – Dwellings with gardens
10. Miscellaneous dwellings/structures adjacent to Granby Road
11. Smithy (1897)
12. "The Castle" – Dwelling (1899)

T Tramways – various around site

Q Chalk quarry face – Southern boundary

1966-2003 Site Features (Other features added as appropriate with date) – 1973 Survey Used

SHOWN IN BLUE (unless noted otherwise)

20. Paper Mill Buildings – Various buildings marked as "Mills"
21. Two different buildings shown on 1973 Survey at this location – largest/latest structure shown.

AR. Access Roads – First shown on 1966 Survey

A. Above ground storage tanks (water tanks shown blue, other unknown tanks shown red)

AV. Numerous above ground tanks and other items shown on 1980 and 1994 Surveys in highlighted/highlighted area to South of buildings

R. Disused railway line – In use on 1966 Survey

TC. Railway and Travelling Crane – Stockyard and feeding to Jetty/Bowater's Wharf

Q Chalk quarry face – Southern boundary

WP/WT. Circular pond and tall hexagonal water storage tank

GVR

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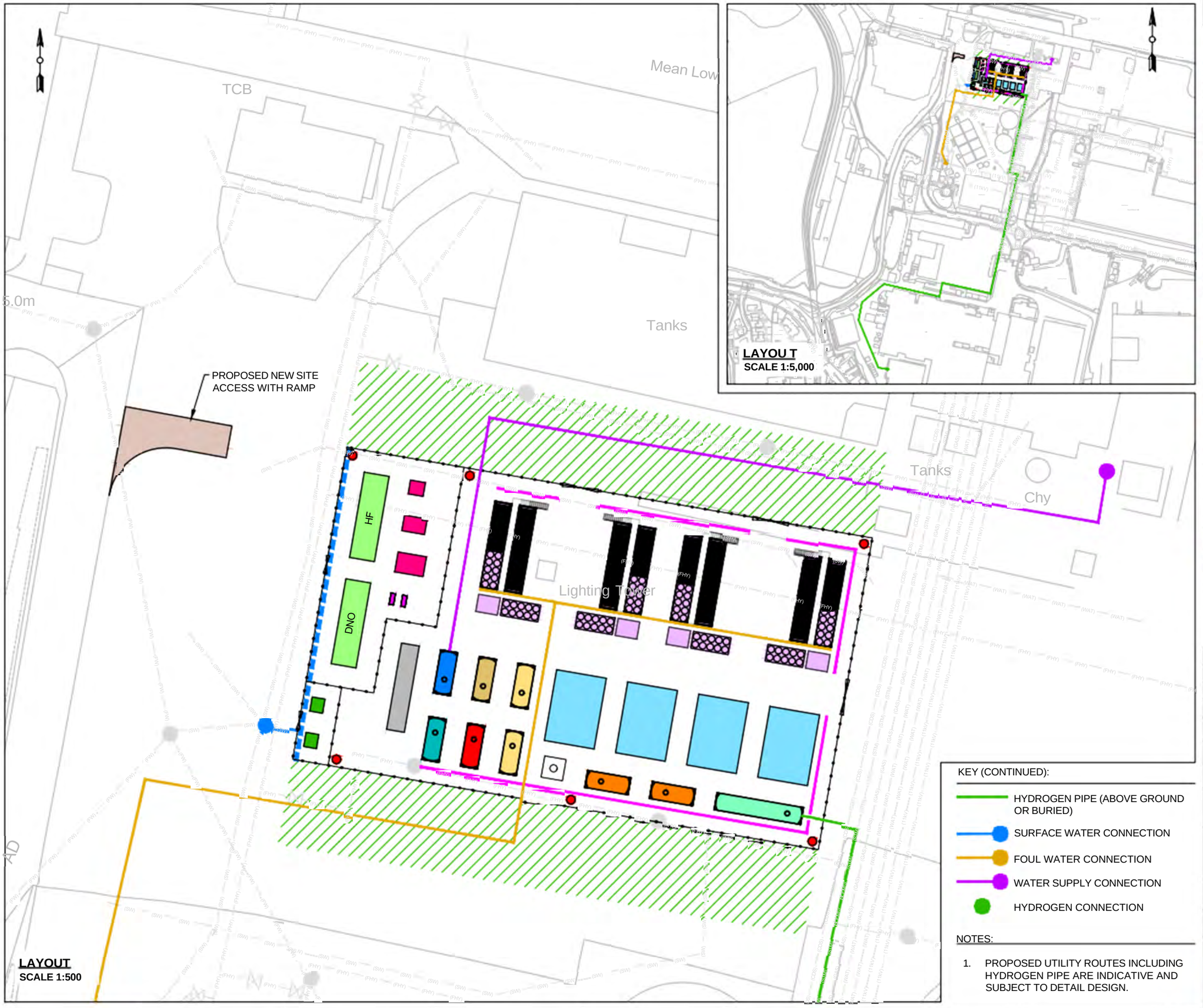
37-38 Market Street, Ferryhill, DL17 8JH
e: grant@gvrgeo.co.uk
t: 07795 616 513

Job: Kimberley Clark Northfleet

Title: Historic Site Features

Client: Hydro Energy Ltd

Scale
As shown
Revision
0
Drawing Number
G-22-049-002



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KEY:

- COMPRESSOR
- GRID COMPLIANCE EQUIPMENT
- HYDROGEN ELECTROLYSERS
- INSTRUMENTATION AIR UNIT
- LOW PRESSURE BUFFER TANK
- METER CABINET
- NITROGEN
- ODOURISATION SYSTEM
- UNINTERRUPTIBLE POWER SUPPLY
- PRESSURE LET DOWN SYSTEM
- OFFICE AND SPARES CONTAINER
- HYDROGEN STORAGE
- DNO — DNO SUBSTATION
- HF — HYDROGEN FACILITY SUBSTATION
- EMERGENCY VENT STACK
- WATER FEED TANK
- VEHICLE BARRIER
- SECURITY FENCE
- GATE
- CCTV / LIGHTING COLUMN
- CRANEAGE AREA
- SURFACE WATER DRAIN

KEY (CONTINUED):

- HYDROGEN PIPE (ABOVE GROUND OR BURIED)
- SURFACE WATER CONNECTION
- FOUL WATER CONNECTION
- WATER SUPPLY CONNECTION
- HYDROGEN CONNECTION

NOTES:

1. PROPOSED UTILITY ROUTES INCLUDING HYDROGEN PIPE ARE INDICATIVE AND SUBJECT TO DETAIL DESIGN.

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
3	BM	DC	MK	2023-05-18	UPDATED LAYOUT
2	BM	DC	MC	2023-01-18	CHANGED SITE LOCATION
1	BM	BY APPD	MC	2022-09-01	FIRST ISSUE

PURPOSE: PRELIMINARY	COORDINATES: OSGB 1936
SCALE: AS SHOWN @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
GREEN HYDROGEN 3
KIMBERLY CLARK NORTHFLEET

DRAWING TITLE
PRELIMINARY
INFRASTRUCTURE LAYOUT

RES DRAWING NUMBER	REV
05135-RES-PRO-DR-PE-001	3

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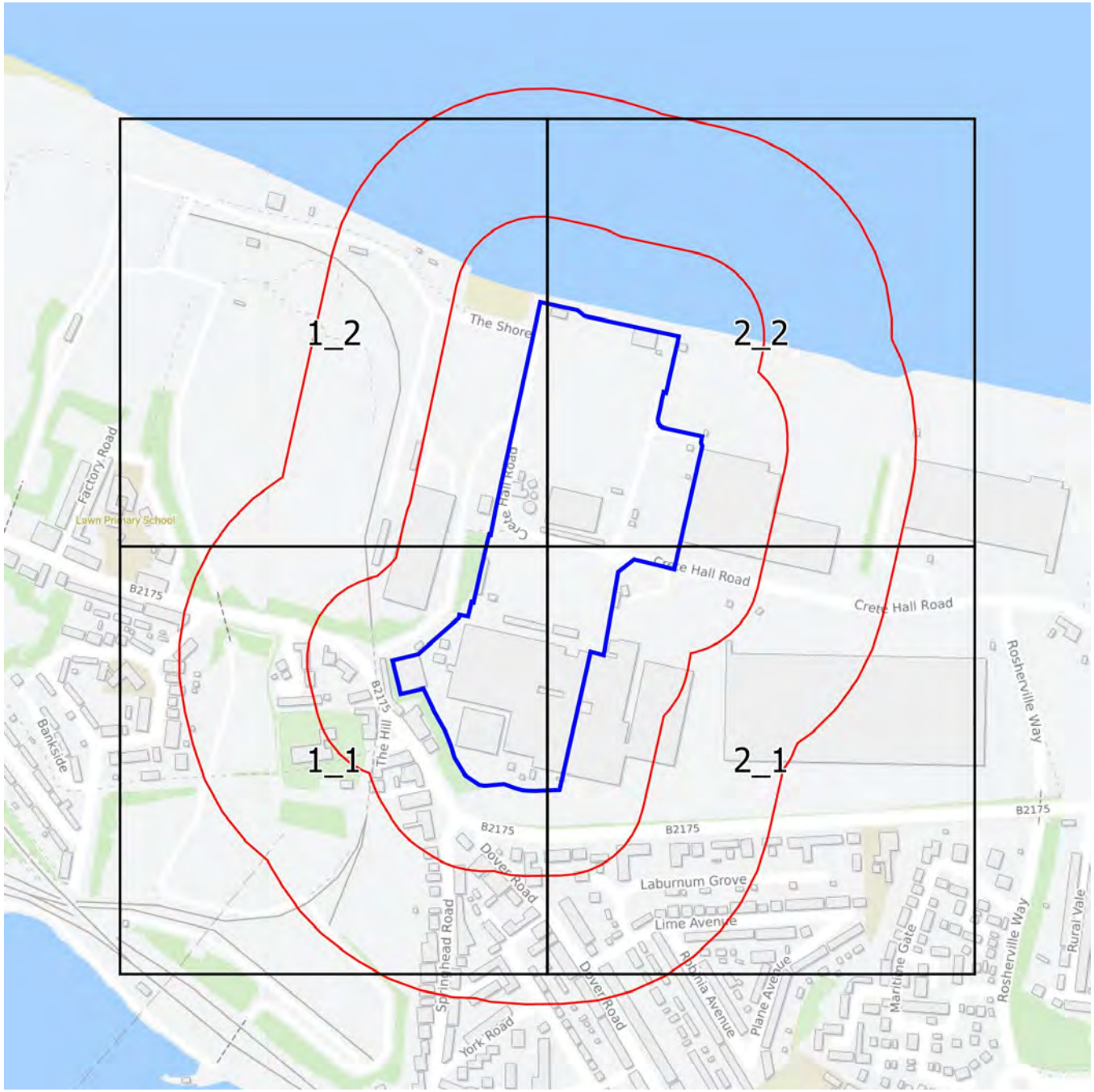
KINGS LANGLEY,
HERTS WD4 8LR. UK
TEL +44 (0) 1923 299200
WWW.RES-GROUP.COM

Appendix B

Historical Maps



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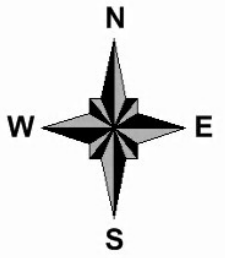
1:1,250 Scale Grid Index



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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_2
Grid Ref: 562379, 174634

Map Name: National Grid
Map date: **1952**
Scale: 1:1,250
Printed at: 1:2,000

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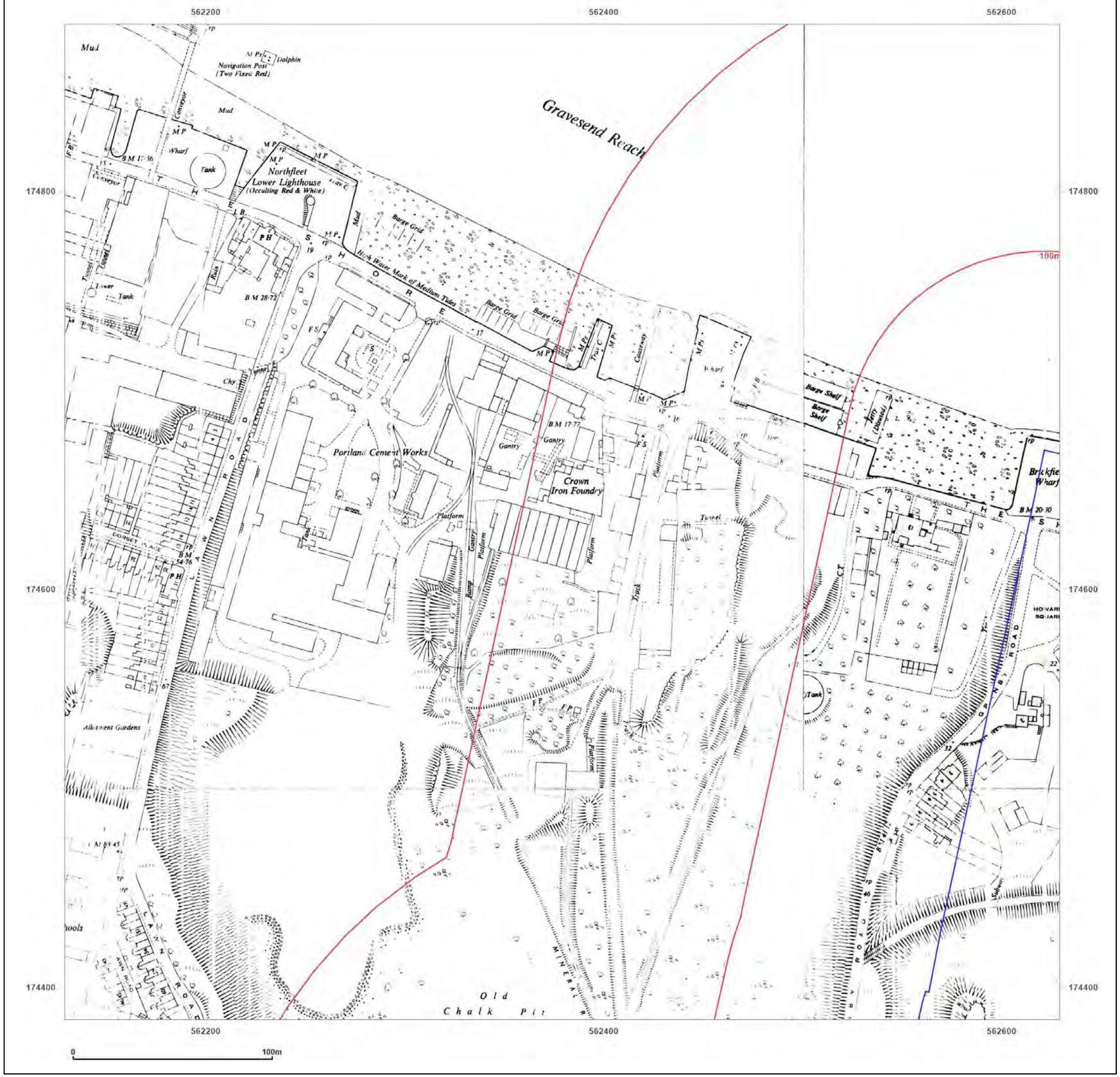

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_2
Grid Ref: 562379, 174634

Map Name: National Grid
Map date: **1953**
Scale: 1:1,250
Printed at: 1:2,000

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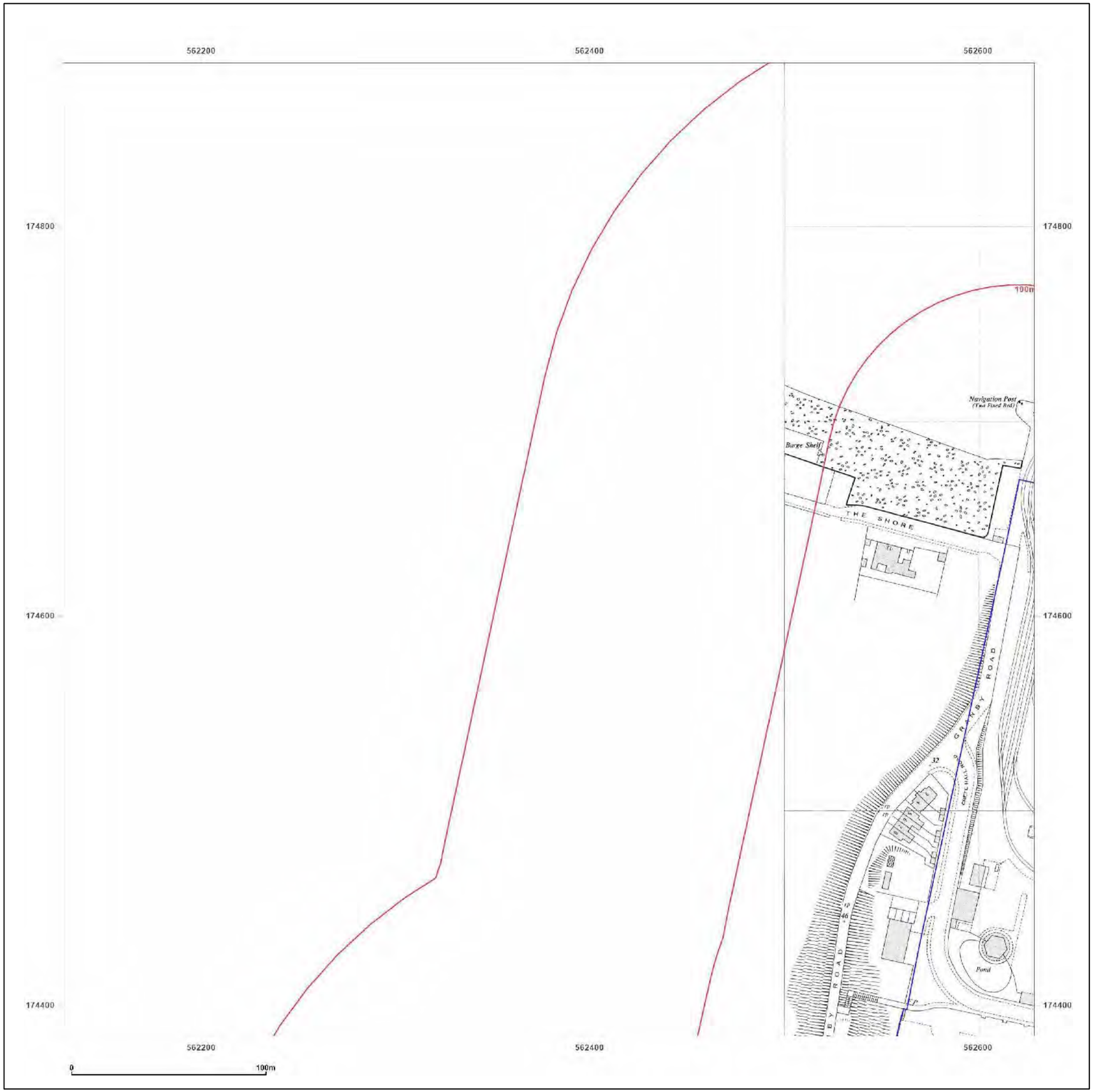

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_2
Grid Ref: 562379, 174634

Map Name: National Grid

Map date: **1959-1960**

Scale: 1:1,250

Printed at: 1:2,000

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Revised 1959
Edition N/A
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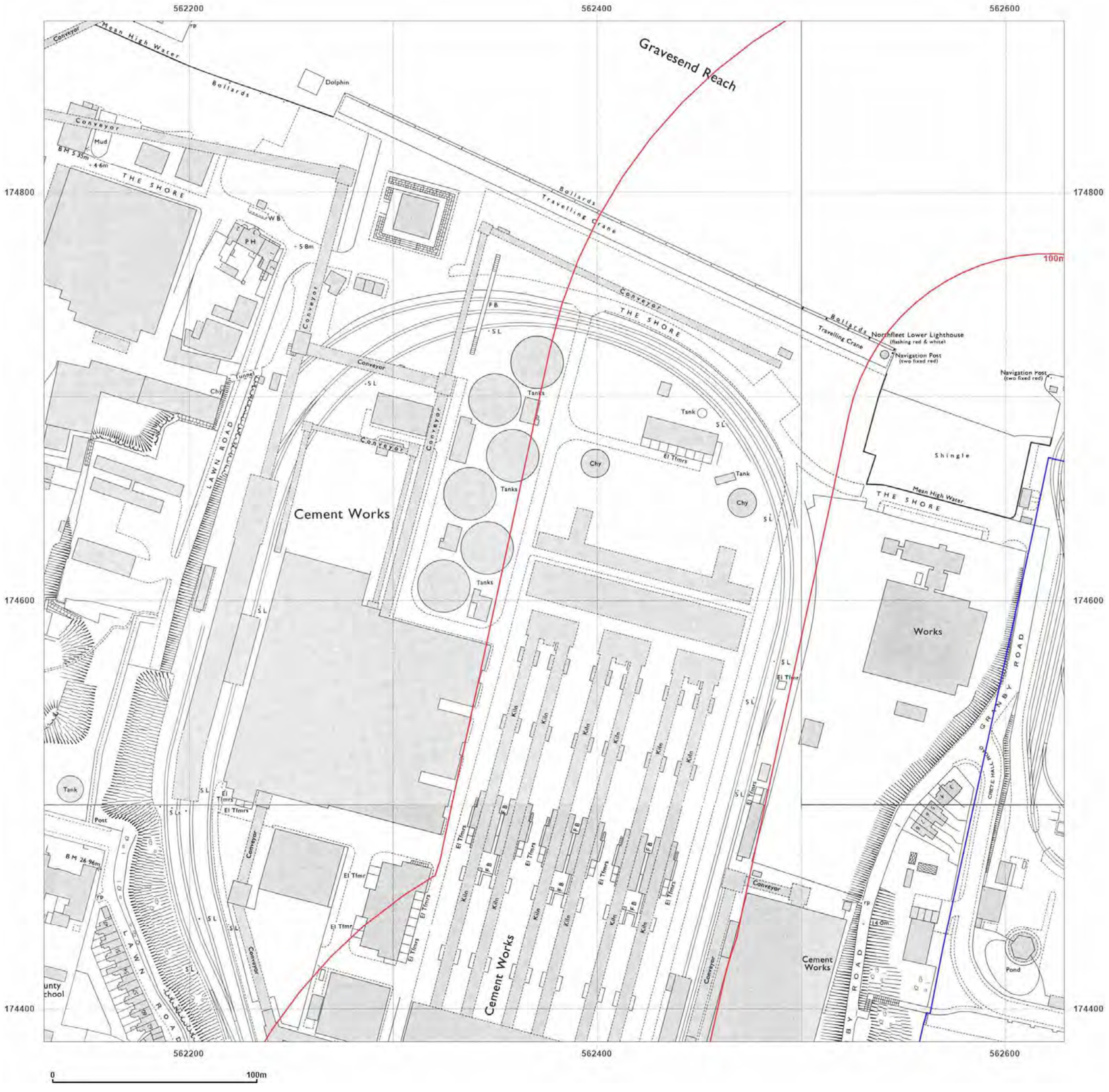

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Client Ref:	G_22_049_PONo203
Report Ref:	GS-XIR-LDG-629-O6R_1250_1_2
Grid Ref:	562379, 174634

Map Name:	National Grid
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Scale:	1:1,250
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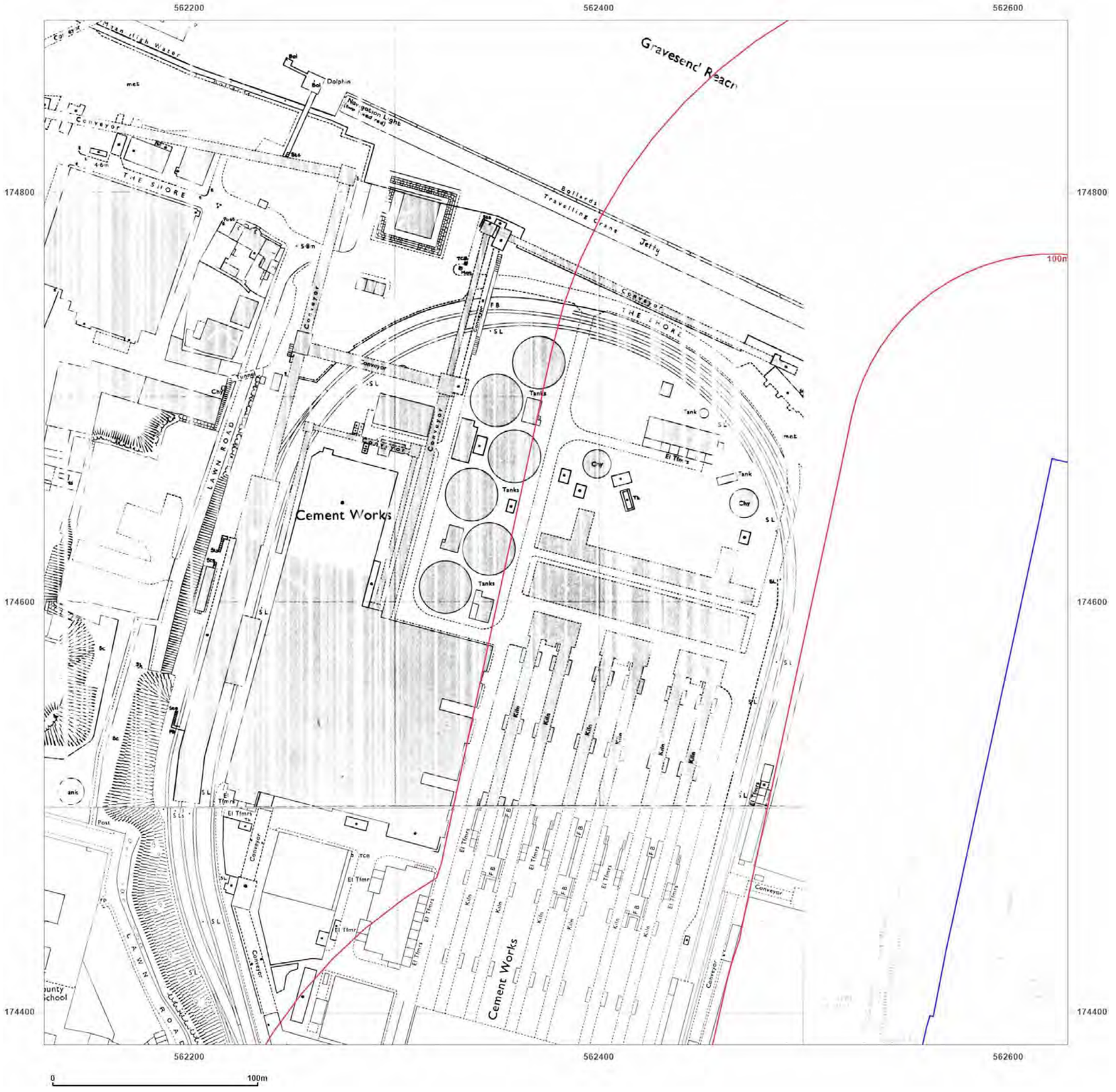

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_2
Grid Ref: 562379, 174634

Map Name: National Grid

Map date: **1978-1980**

Scale: 1:1,250

Printed at: 1:2,000

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_2
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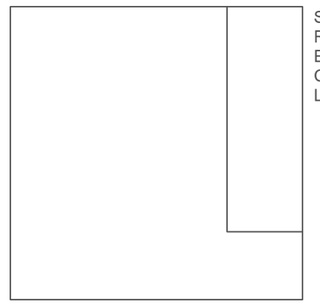

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_2
Grid Ref: 562879, 174634

Map Name: National Grid
Map date: **1952**
Scale: 1:1,250
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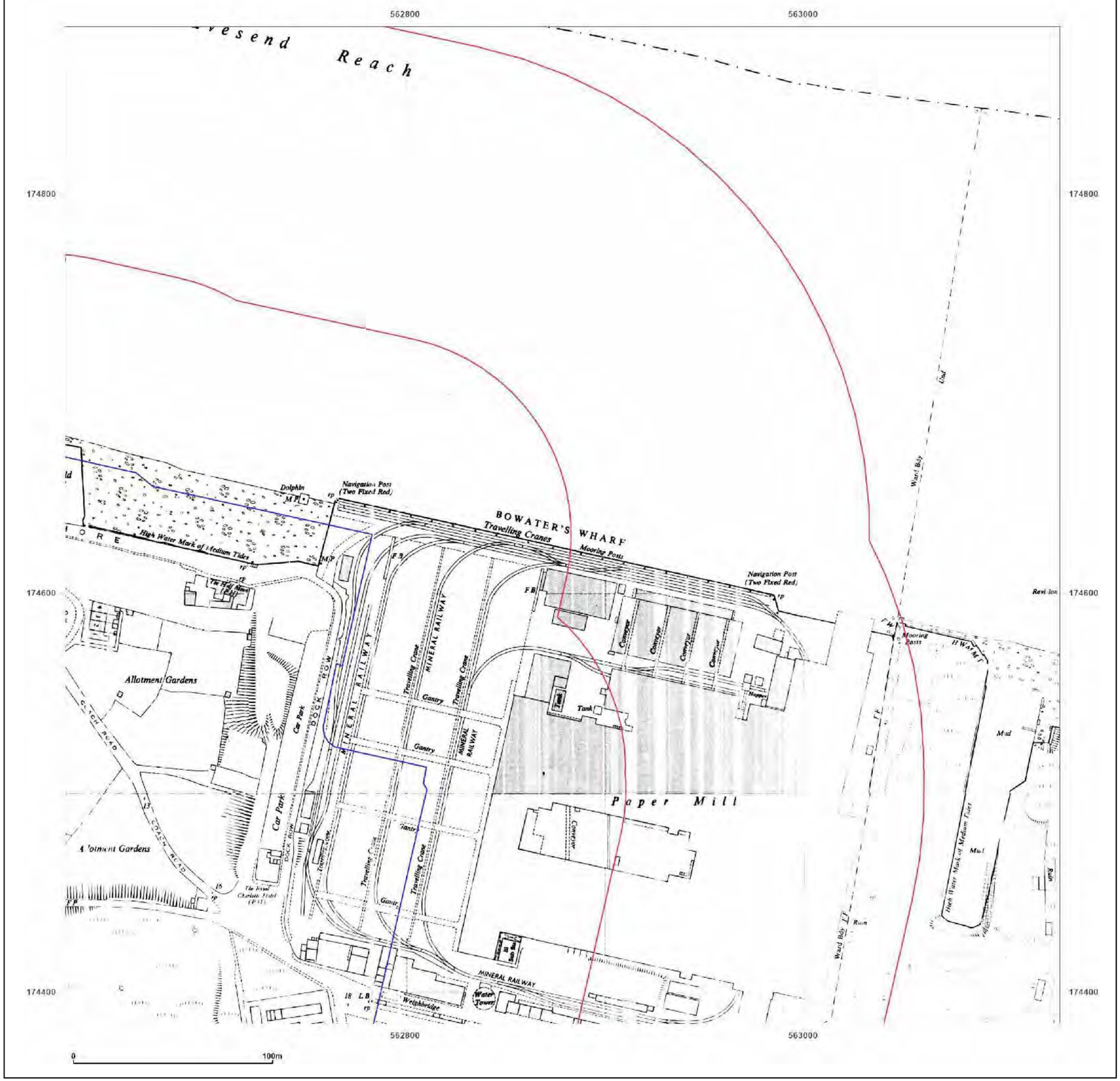

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Grid Ref:	562879, 174634

Map Name:	National Grid
Map date:	**1953**
Scale:	1:1,250
Printed at:	1:2,000

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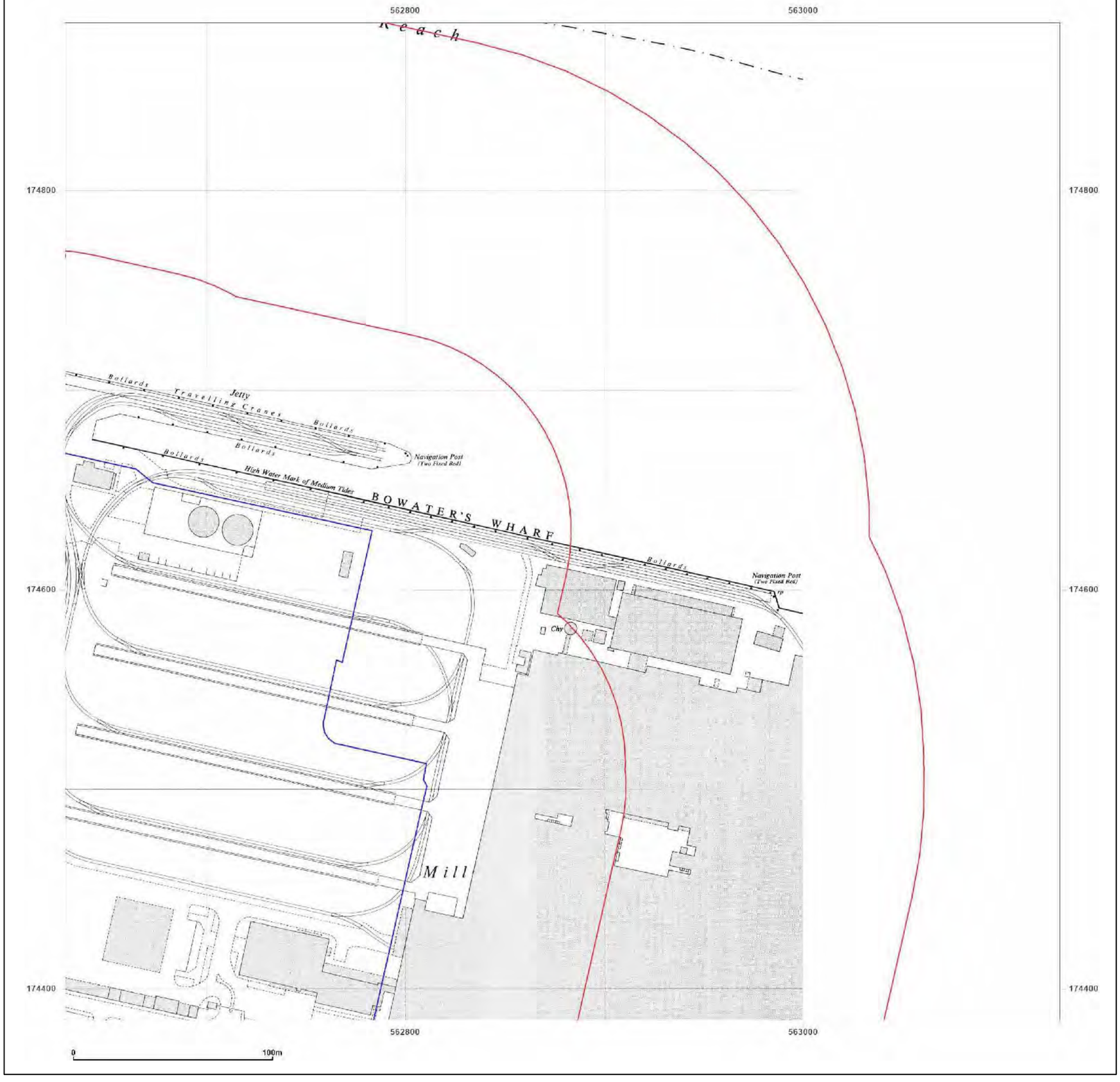

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Client Ref: G_22_049_PONo203
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Grid Ref: 562879, 174634

Map Name: National Grid
Map date: **1959-1960**
Scale: 1:1,250
Printed at: 1:2,000

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_2
Grid Ref: 562879, 174634

Map Name: National Grid

Map date: **1960-1965**

Scale: 1:1,250

Printed at: 1:2,000

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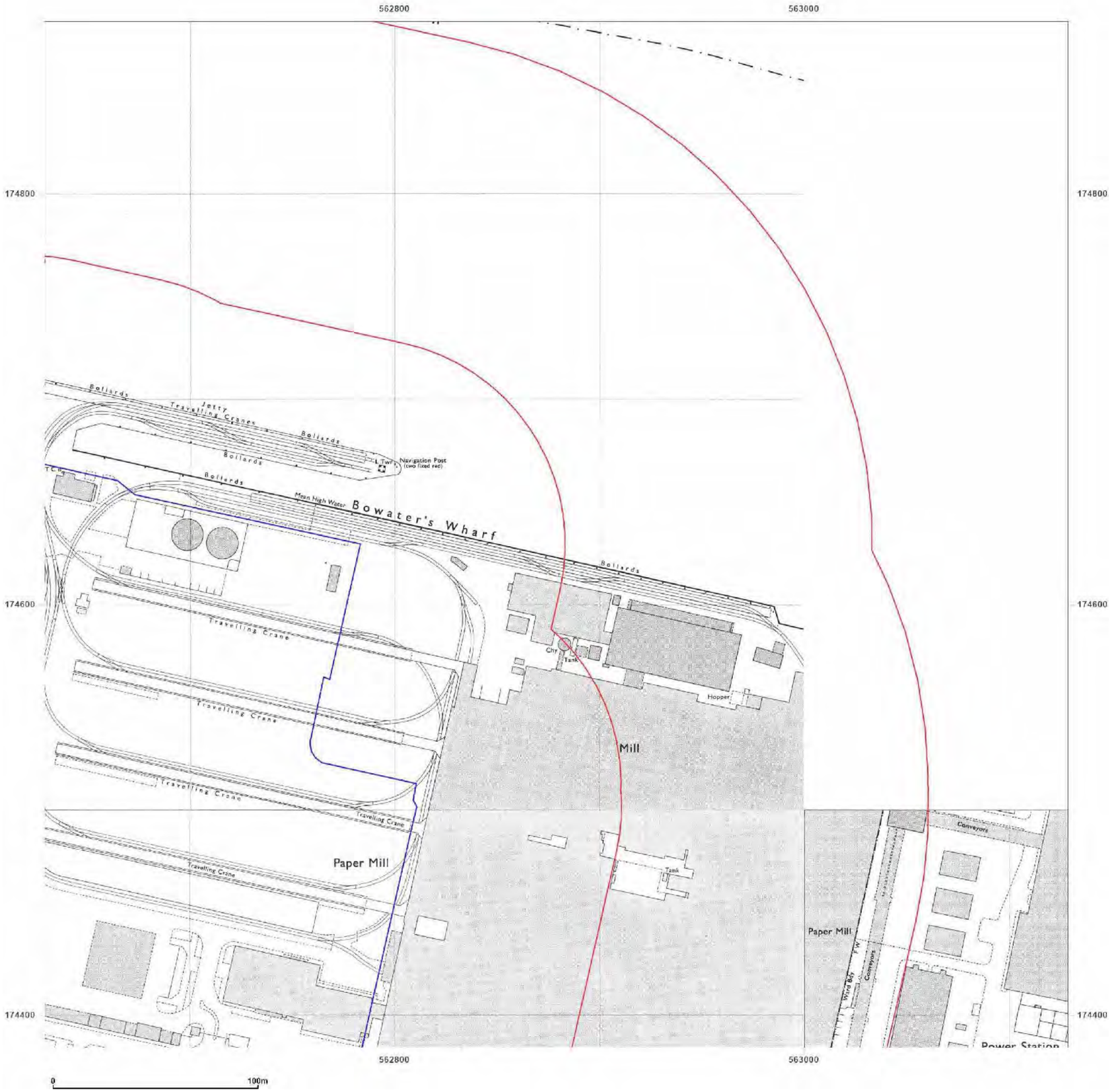

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_2
Grid Ref: 562879, 174634

Map Name: National Grid
Map date: **1972-1975**
Scale: 1:1,250
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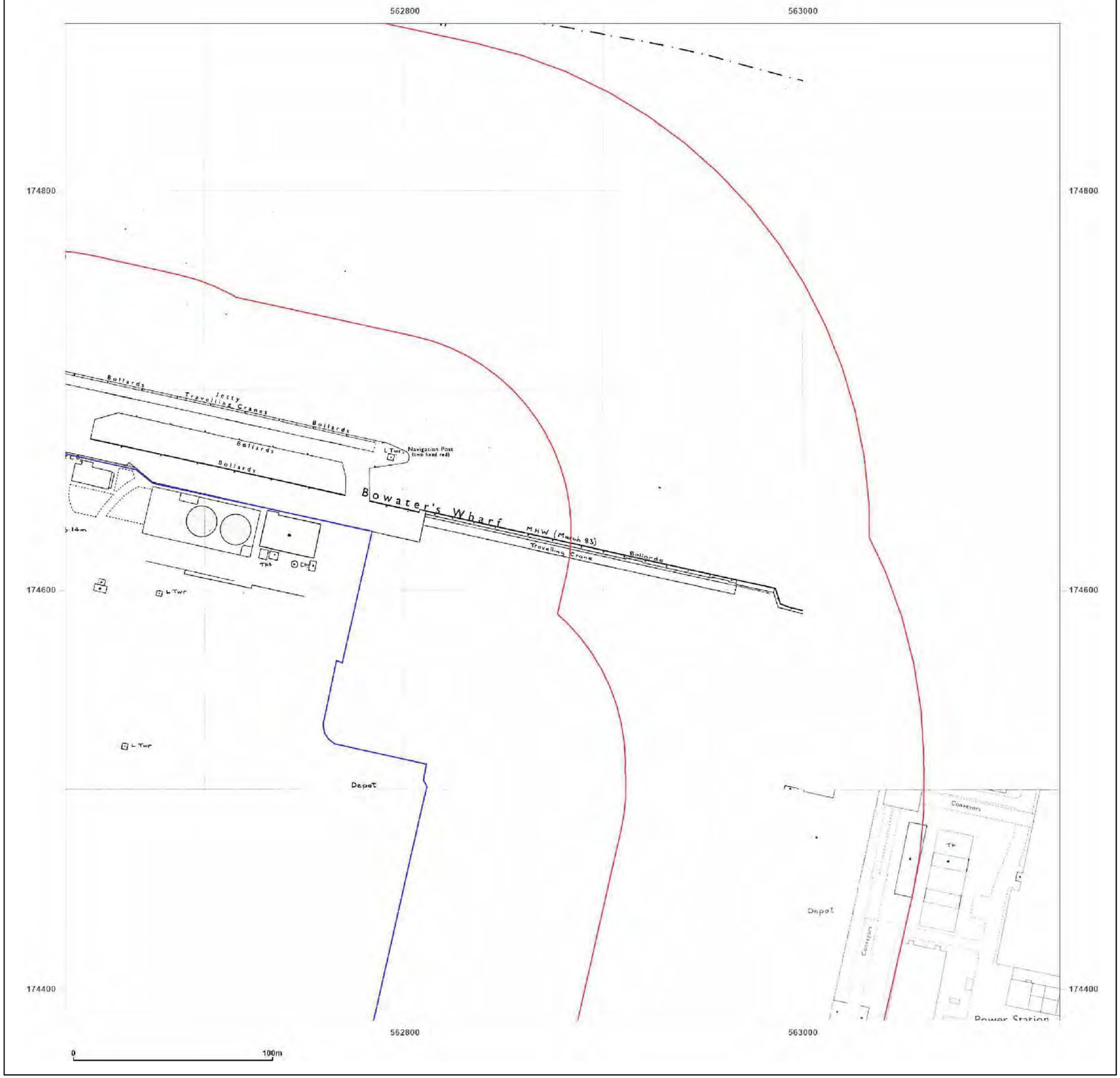

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Client Ref: G_22_049_PONo203
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Grid Ref: 562879, 174634

Map Name: National Grid
Map date: **1985**
Scale: 1:1,250
Printed at: 1:2,000

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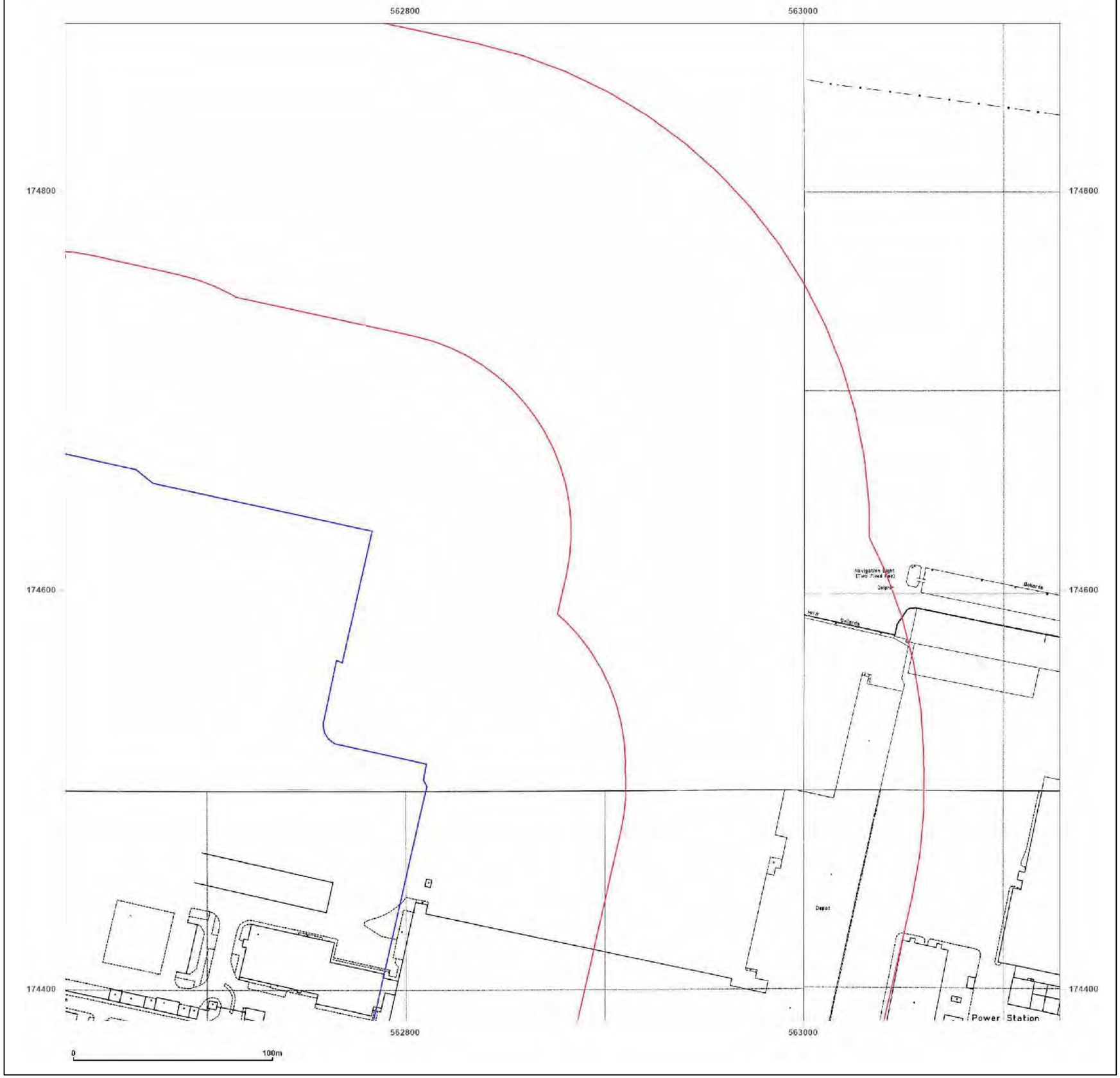

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Client Ref: G_22_049_PONo203
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Map Name: National Grid

Map date: **1993-1995**

Scale: 1:1,250

Printed at: 1:2,000

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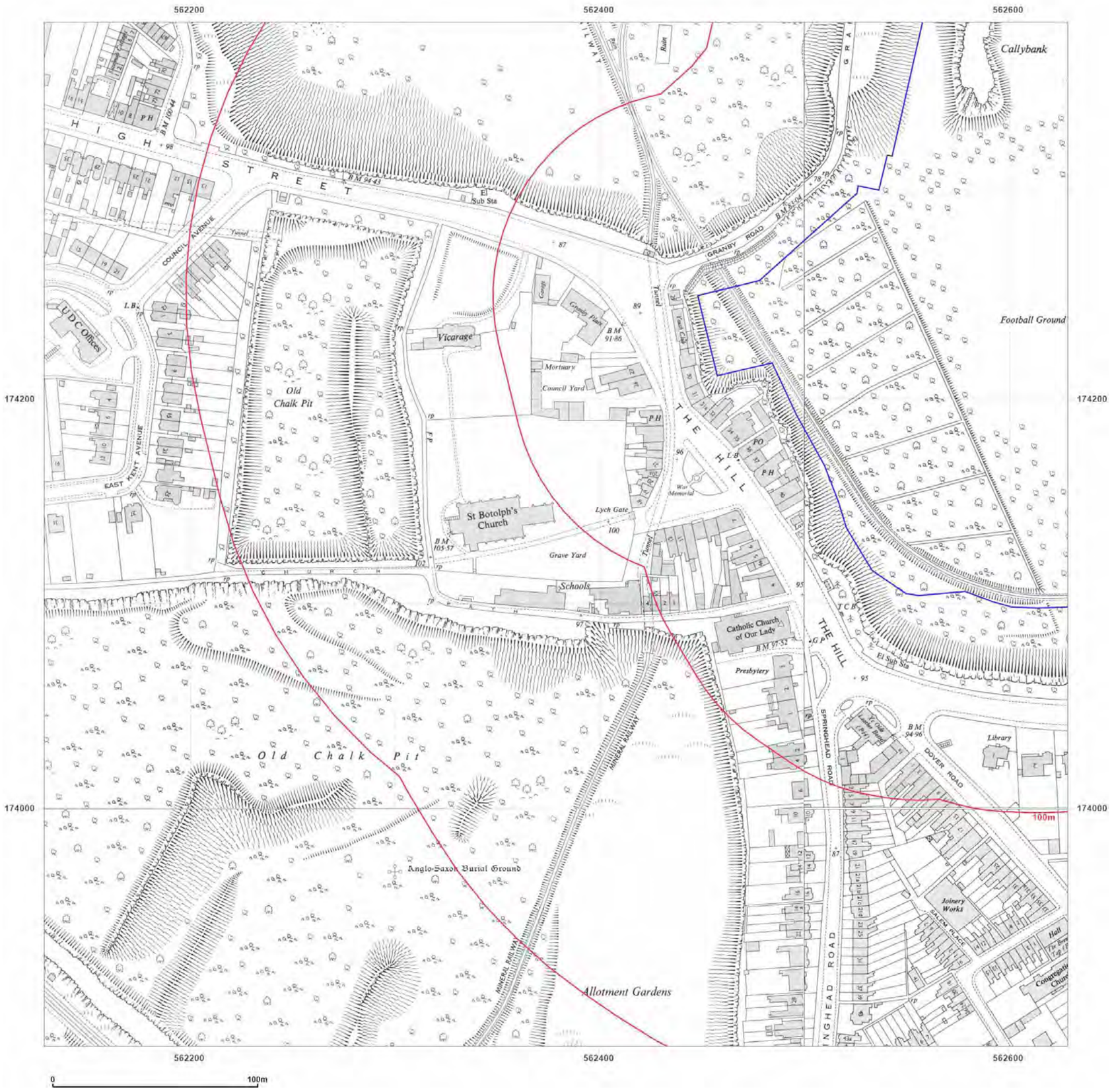

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Site Details:

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Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1952**
Scale: 1:1,250
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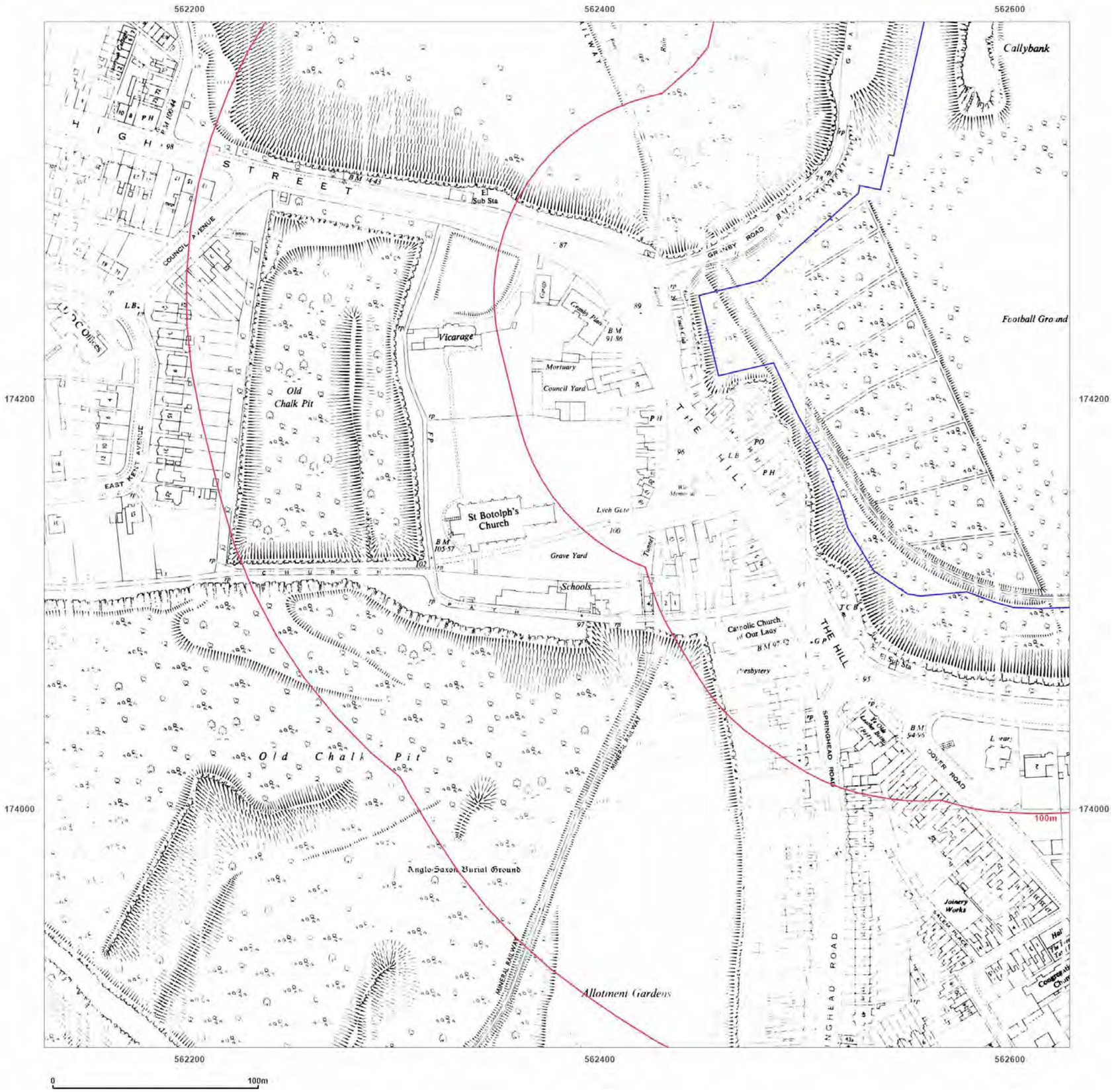

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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1953**
Scale: 1:1,250
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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid

Map date: **1959**

Scale: 1:1,250

Printed at: 1:2,000

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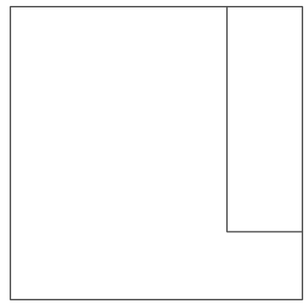

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Edition N/A
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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1960**
Scale: 1:1,250
Printed at: 1:2,000

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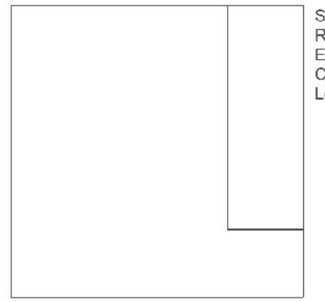

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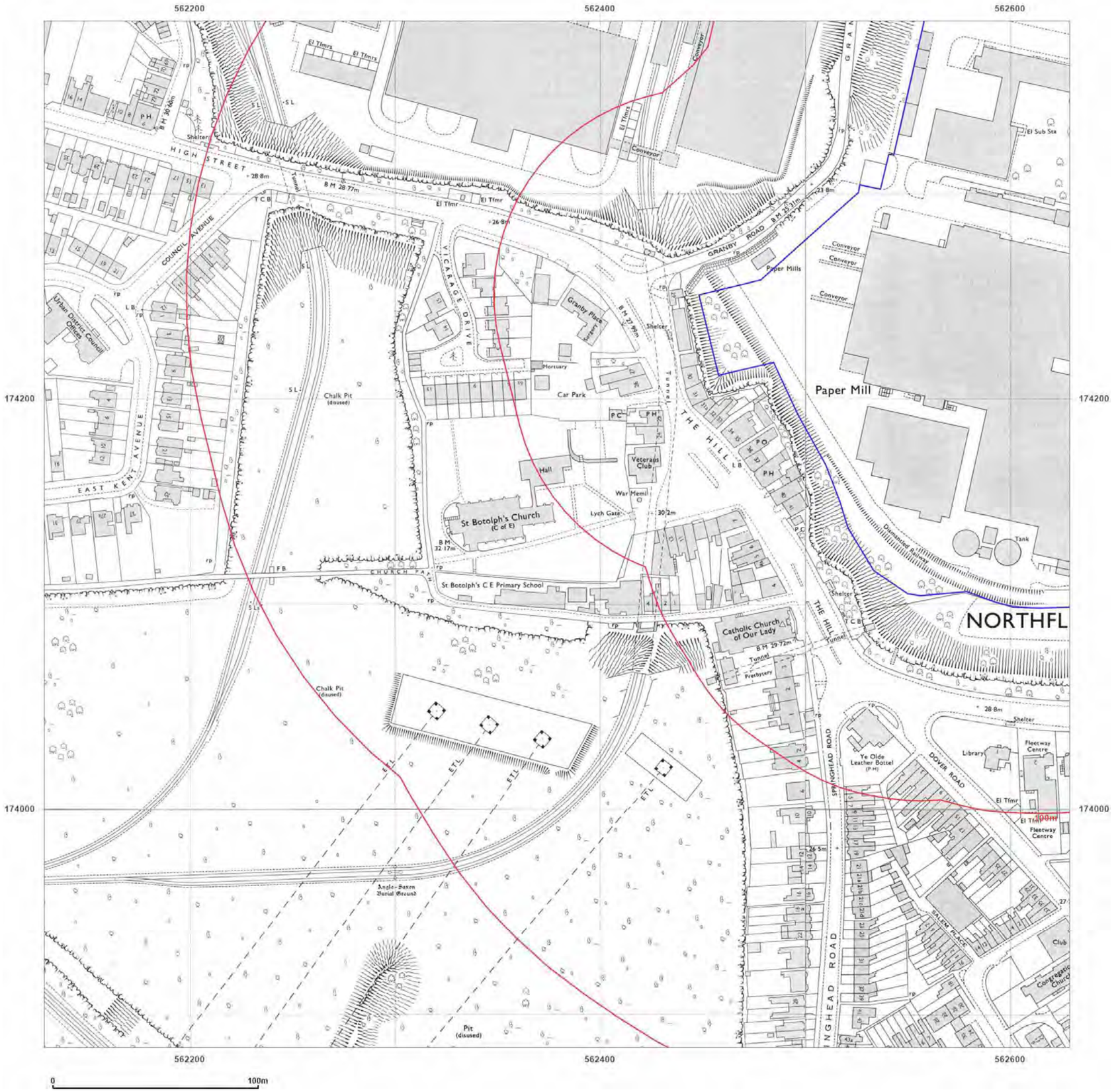

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1972-1973**
Scale: 1:1,250
Printed at: 1:2,000

N W E S

Surveyed 1952 Revised 1972 Edition N/A Copyright 1972 Levelled 1956		Surveyed 1952 Revised 1973 Edition N/A Copyright 1973 Levelled 1956
Surveyed 1952 Revised 1971 Edition N/A Copyright 1972 Levelled 1952		Surveyed 1952 Revised 1971 Edition N/A Copyright 1972 Levelled 1952

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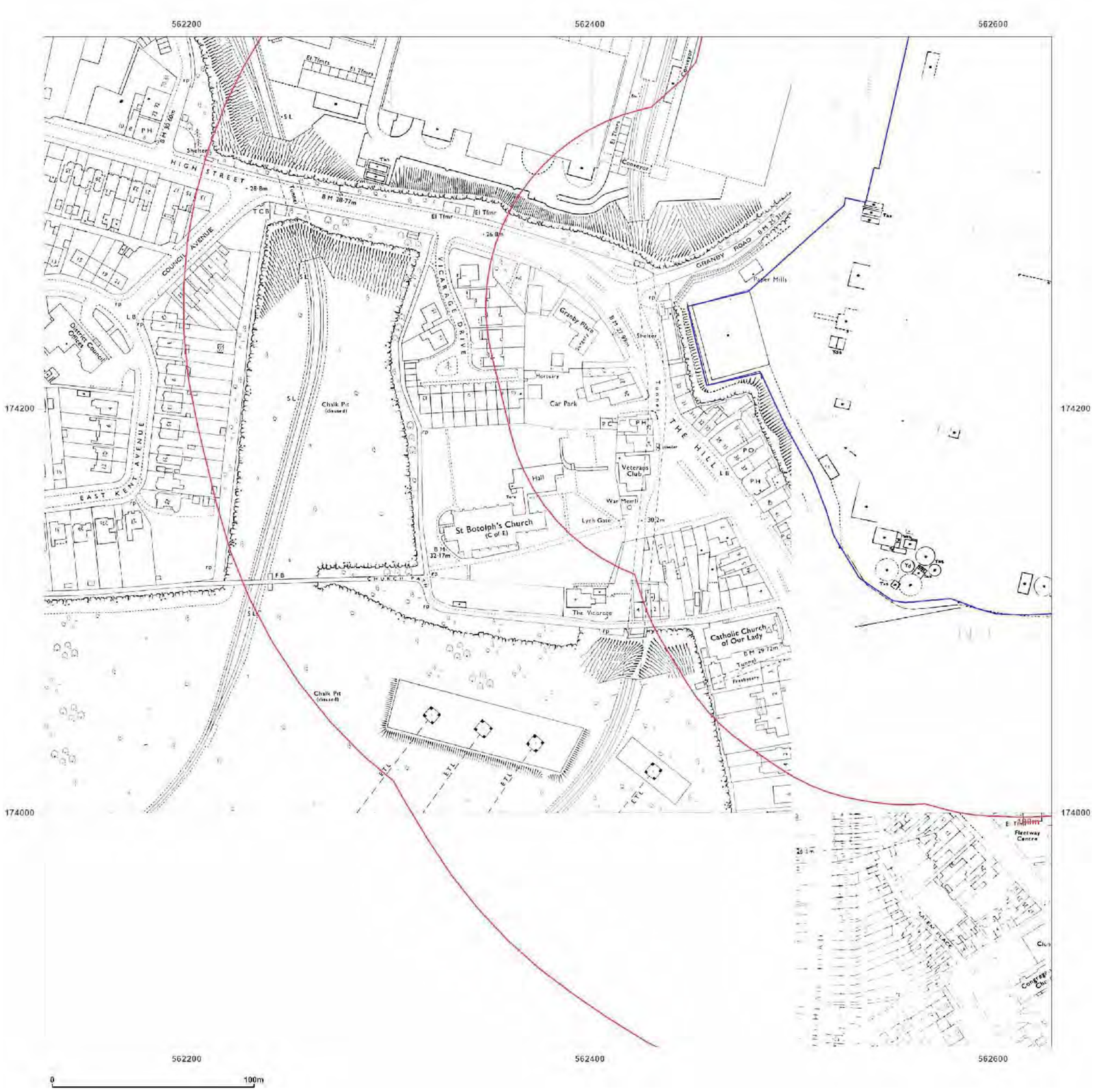

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1977-1980**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1980 Levelled 1956		Surveyed N/A Revised N/A Edition N/A Copyright 1978 Levelled 1956
		Surveyed N/A Revised N/A Edition N/A Copyright 1977 Levelled N/A

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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_1_1
Grid Ref: 562379, 174134

Map Name: National Grid
Map date: **1993-1994**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1994 Revised 1994 Edition N/A Copyright 1994 Levelled N/A		Surveyed 1993 Revised 1993 Edition N/A Copyright 1993 Levelled N/A

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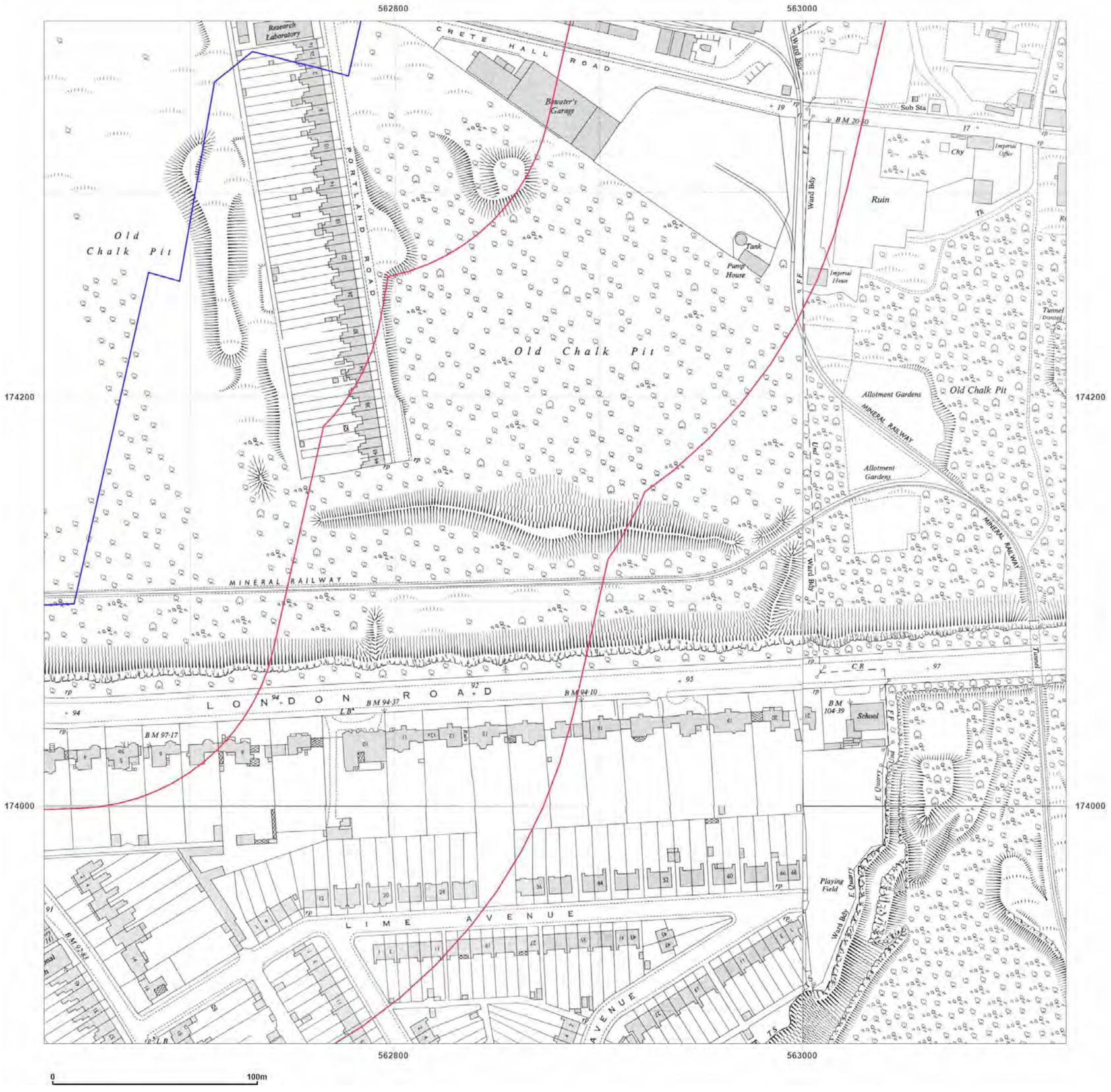

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1952**
Scale: 1:1,250
Printed at: 1:2,000

N W E S

Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952		Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952
Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952		Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1952

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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1953**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A		Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A
Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A		Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A

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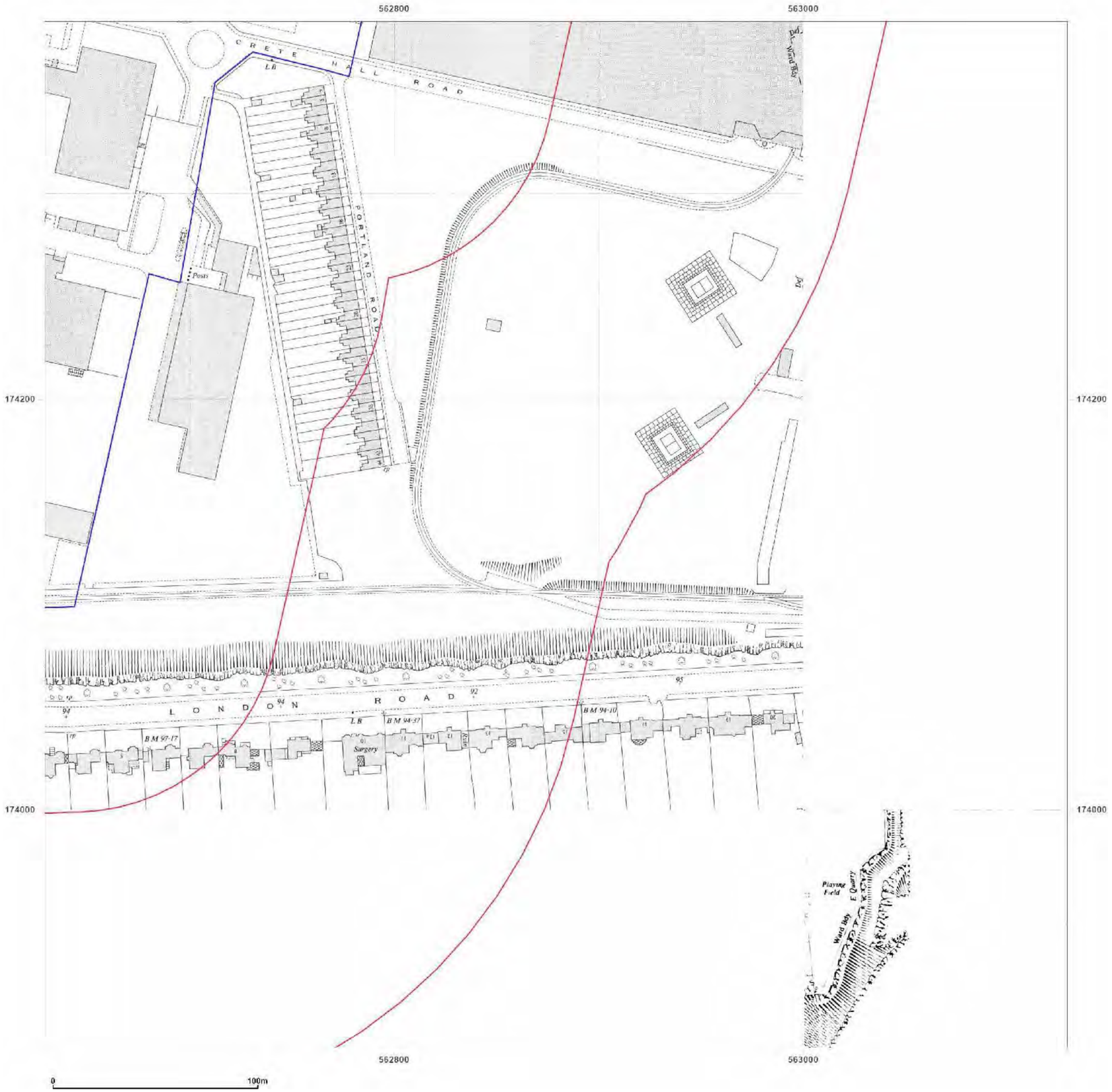
562800
563000
174200
174000
C R E T E H A L L R O A D
P O R T L A N D R O A D
L O N D O N R O A D
Posts
Surgery
Playing Field
E Quarry
Weld Bdy
Pond
Pond
Pond

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1960-1965**
Scale: 1:1,250
Printed at: 1:2,000

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1972-1975**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1952 Revised 1973 Edition N/A Copyright 1973 Levelled 1956		Surveyed 1952 Revised 1975 Edition N/A Copyright 1975 Levelled 1956
Surveyed 1952 Revised 1971 Edition N/A Copyright 1972 Levelled 1952		Surveyed 1952 Revised 1971 Edition N/A Copyright 1972 Levelled 1952

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid

Map date: **1977-1978**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
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Levelled 1956

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1977
Levelled N/A

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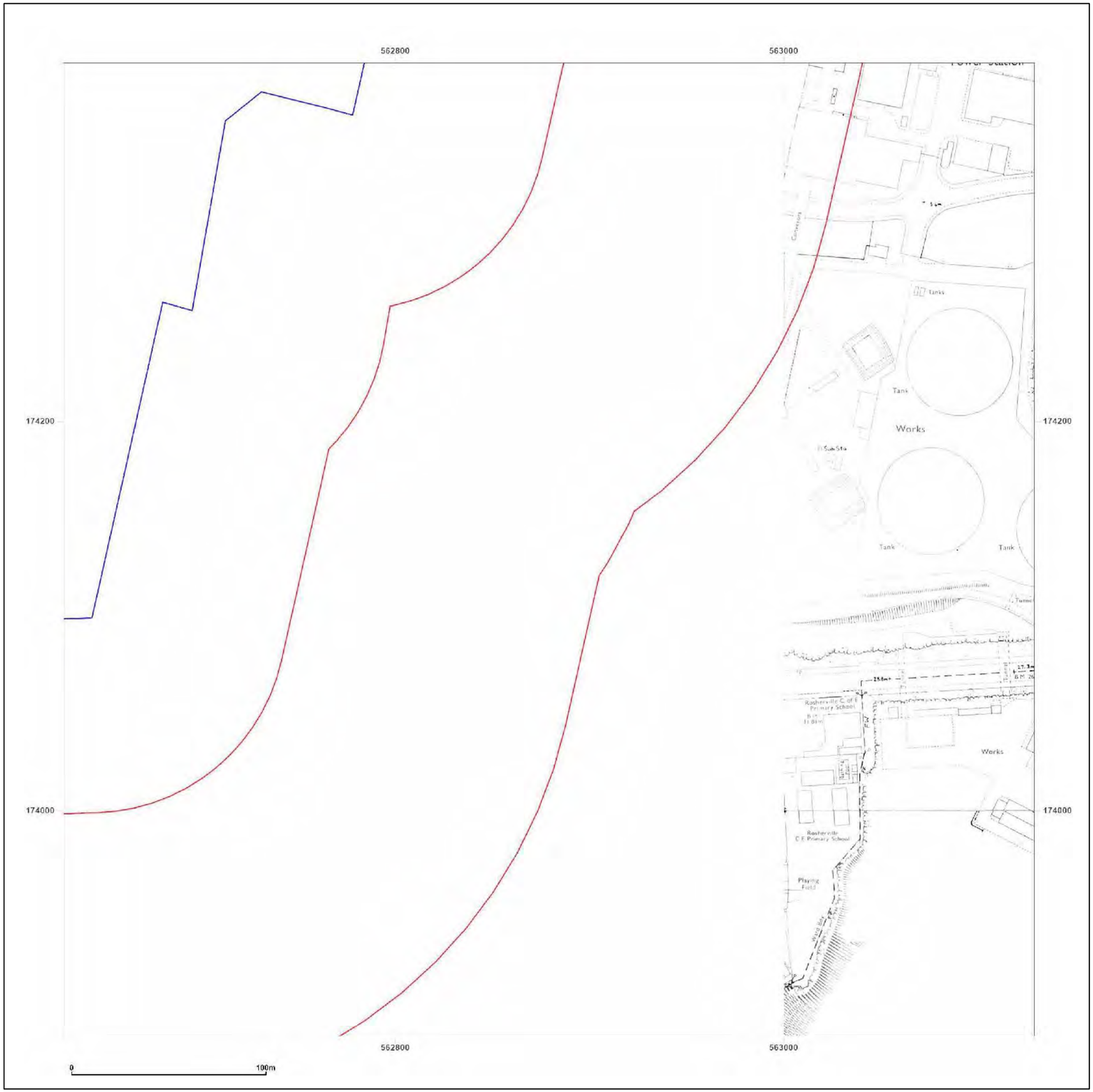

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid

Map date: **1985-1989**

Scale: 1:1,250

Printed at: 1:2,000

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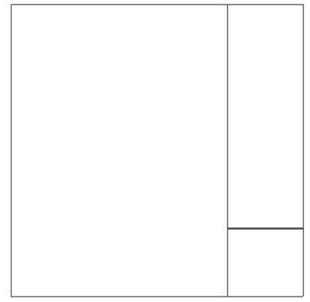

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Surveyed 1983
Revised 1989
Edition N/A
Copyright 1989
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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

N W E S

Surveyed 1993 Revised 1993 Edition N/A Copyright 1993 Levelled N/A		Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A

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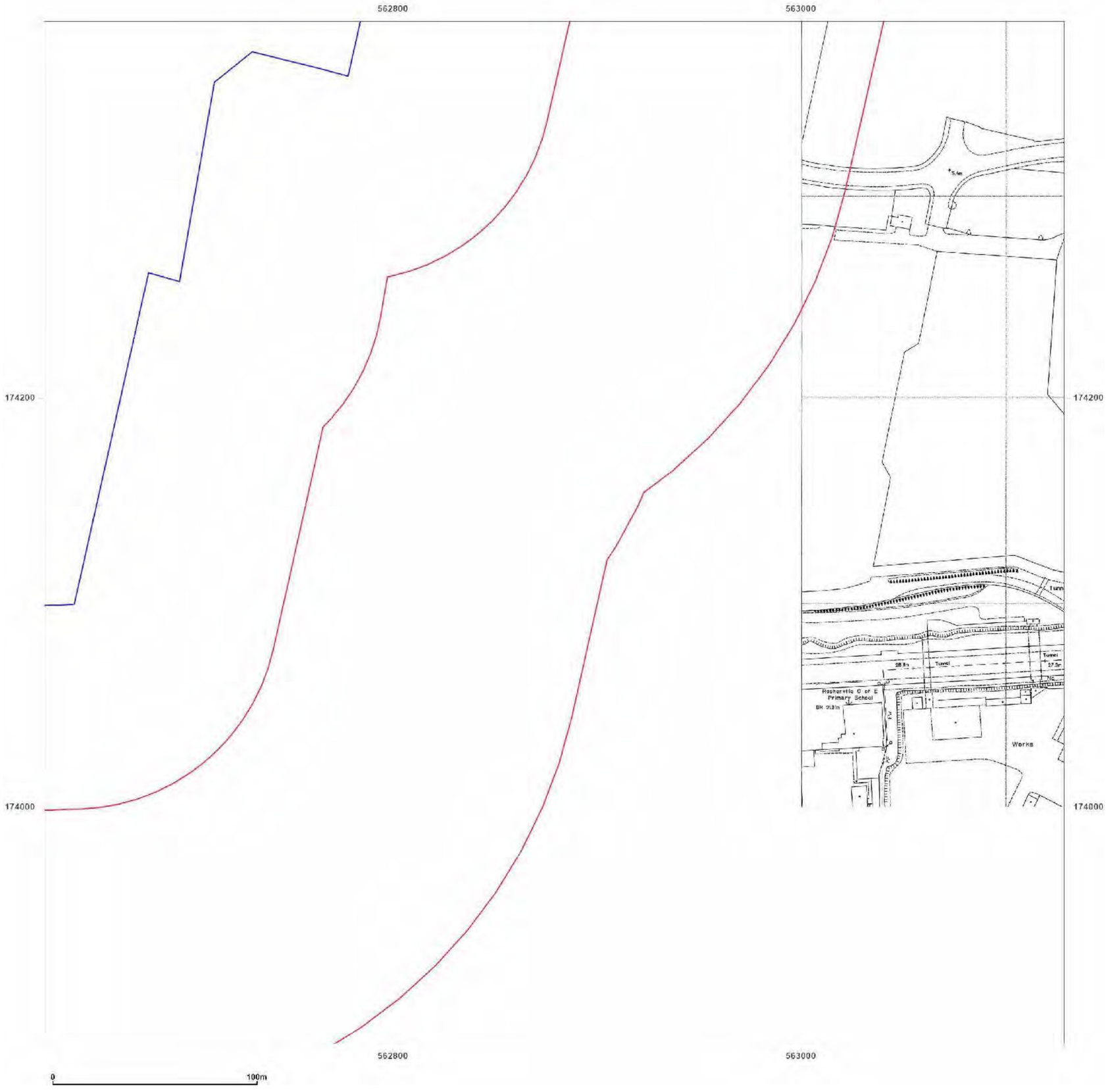

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_1250_2_1
Grid Ref: 562879, 174134

Map Name: National Grid
Map date: **1995**
Scale: 1:1,250
Printed at: 1:2,000

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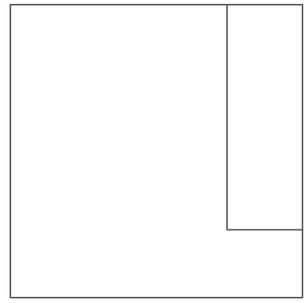

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref:	G_22_049_PONo203
Report Ref:	GS-XIR-LDG-629-O6R_Landline_1_1
Grid Ref:	562479, 174234

Map Name:	LandLine
Map date:	**2003**
Scale:	1:1,250
Printed at:	1:1,250

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_Landline_1_2
Grid Ref: 562479, 174534

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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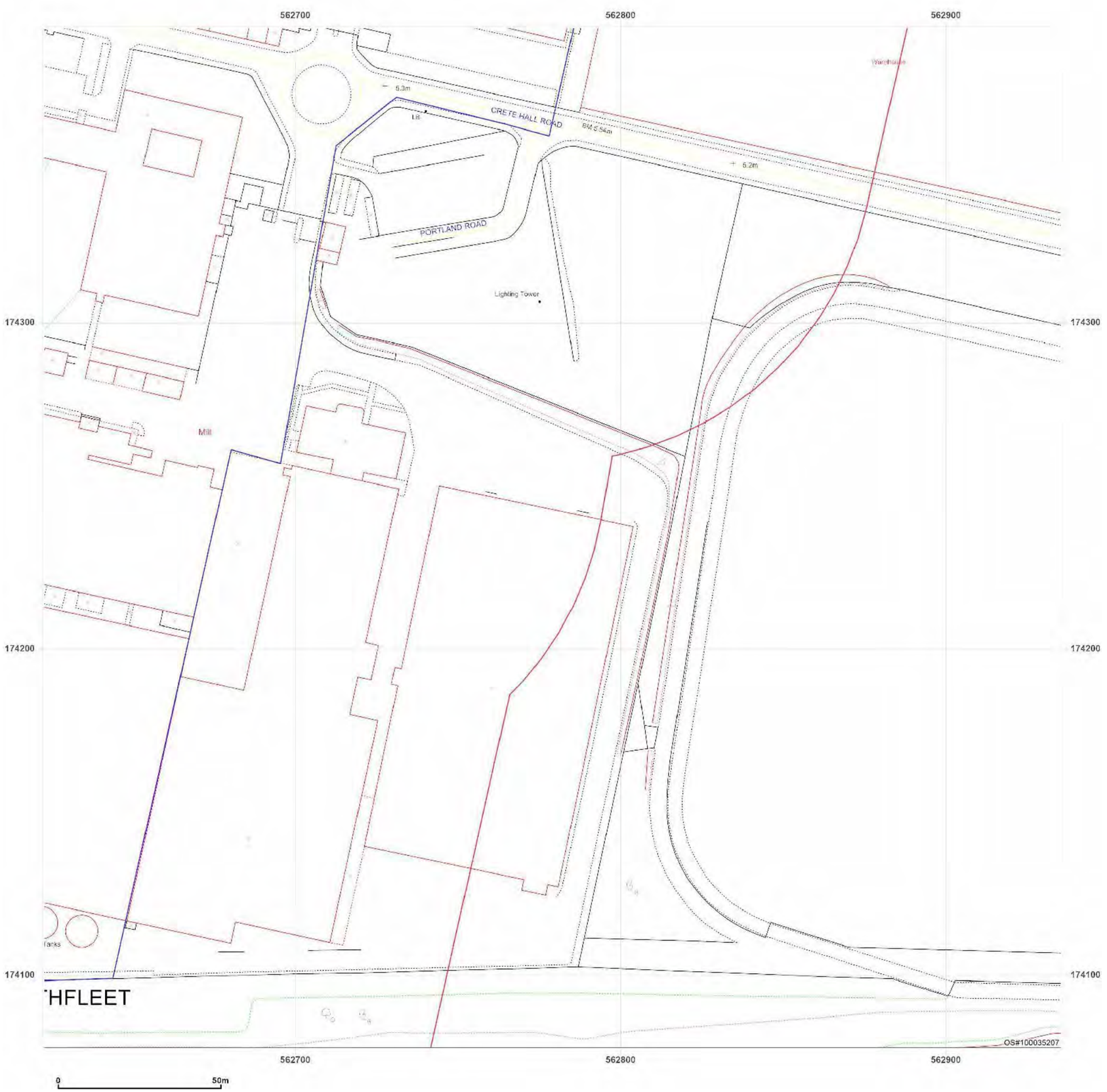

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_Landline_2_1
Grid Ref: 562779, 174234

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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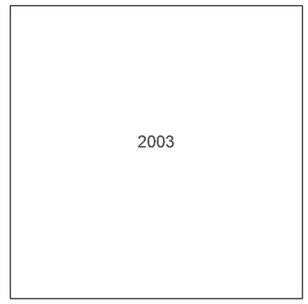

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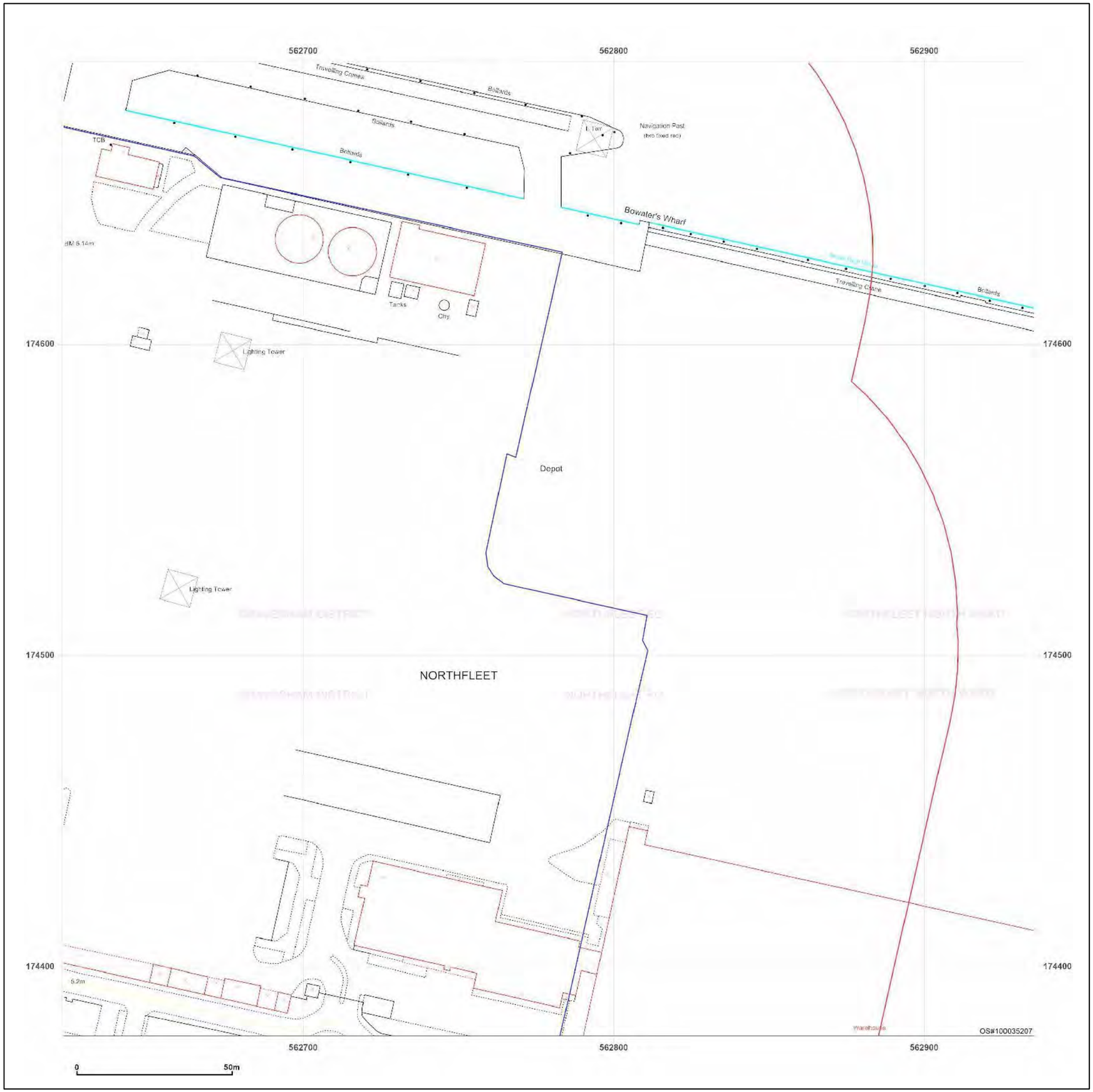

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_Landline_2_2
Grid Ref: 562779, 174534

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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Groundsure INSIGHTS

1:2,500 Scale Grid Index

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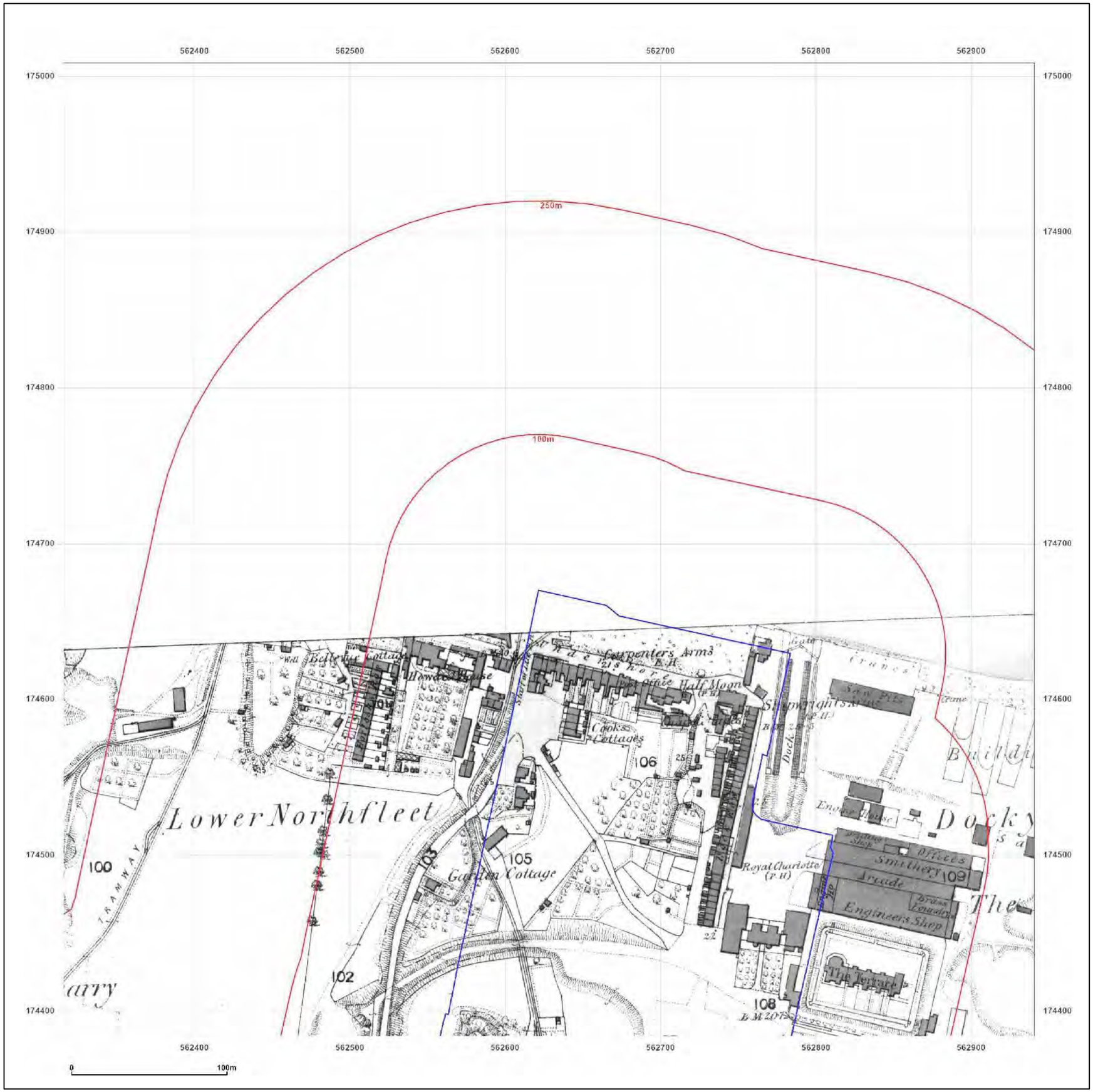

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1865**
Scale: 1:2,500
Printed at: 1:2,500

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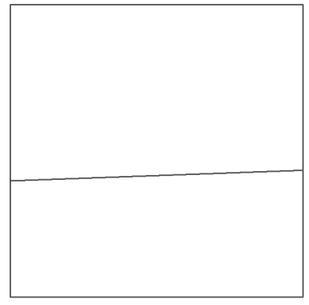

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Edition N/A
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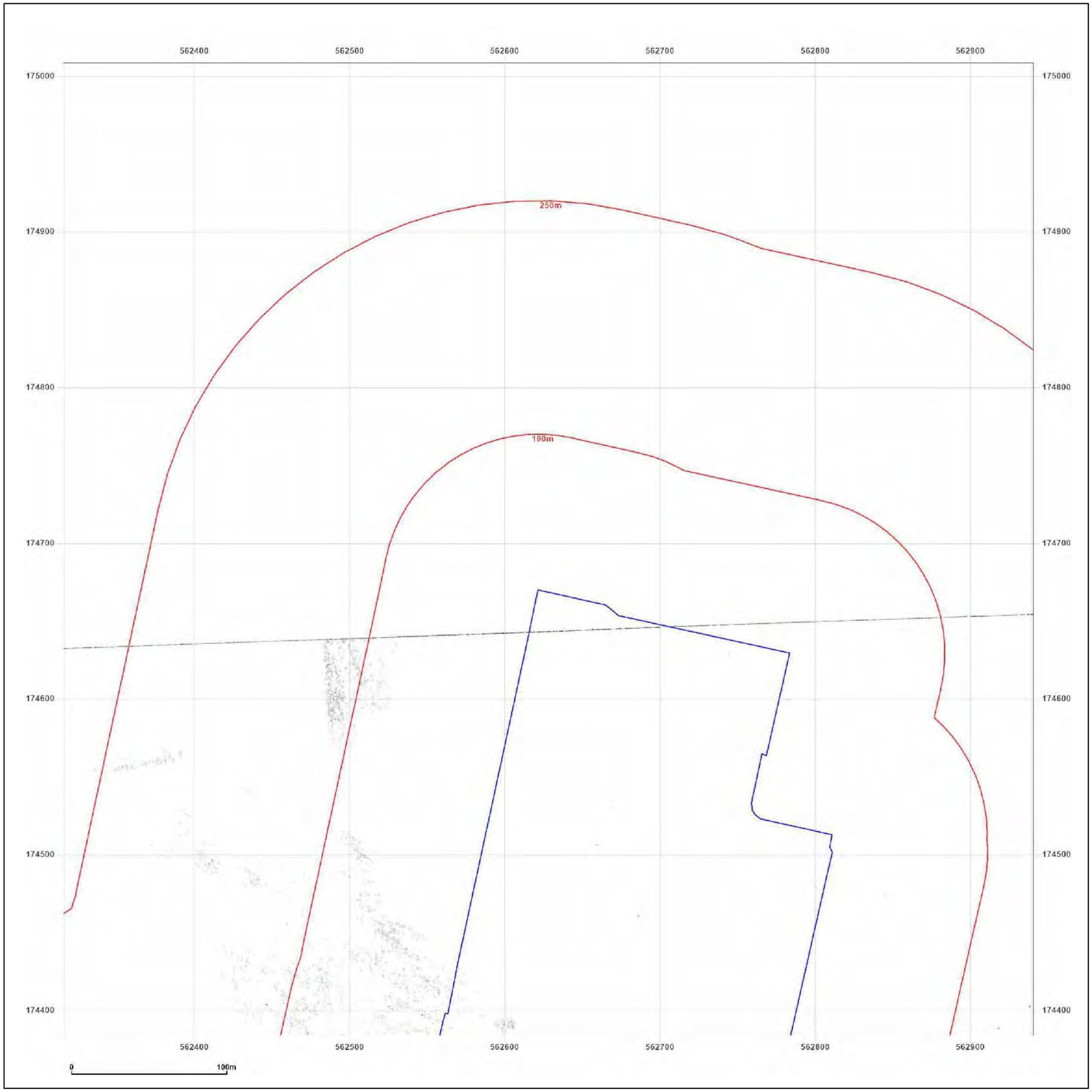

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1866**
Scale: 1:2,500
Printed at: 1:2,500

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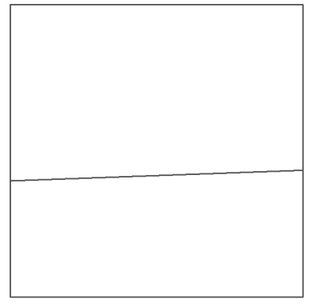

Surveyed 1866
Revised 1866
Edition N/A
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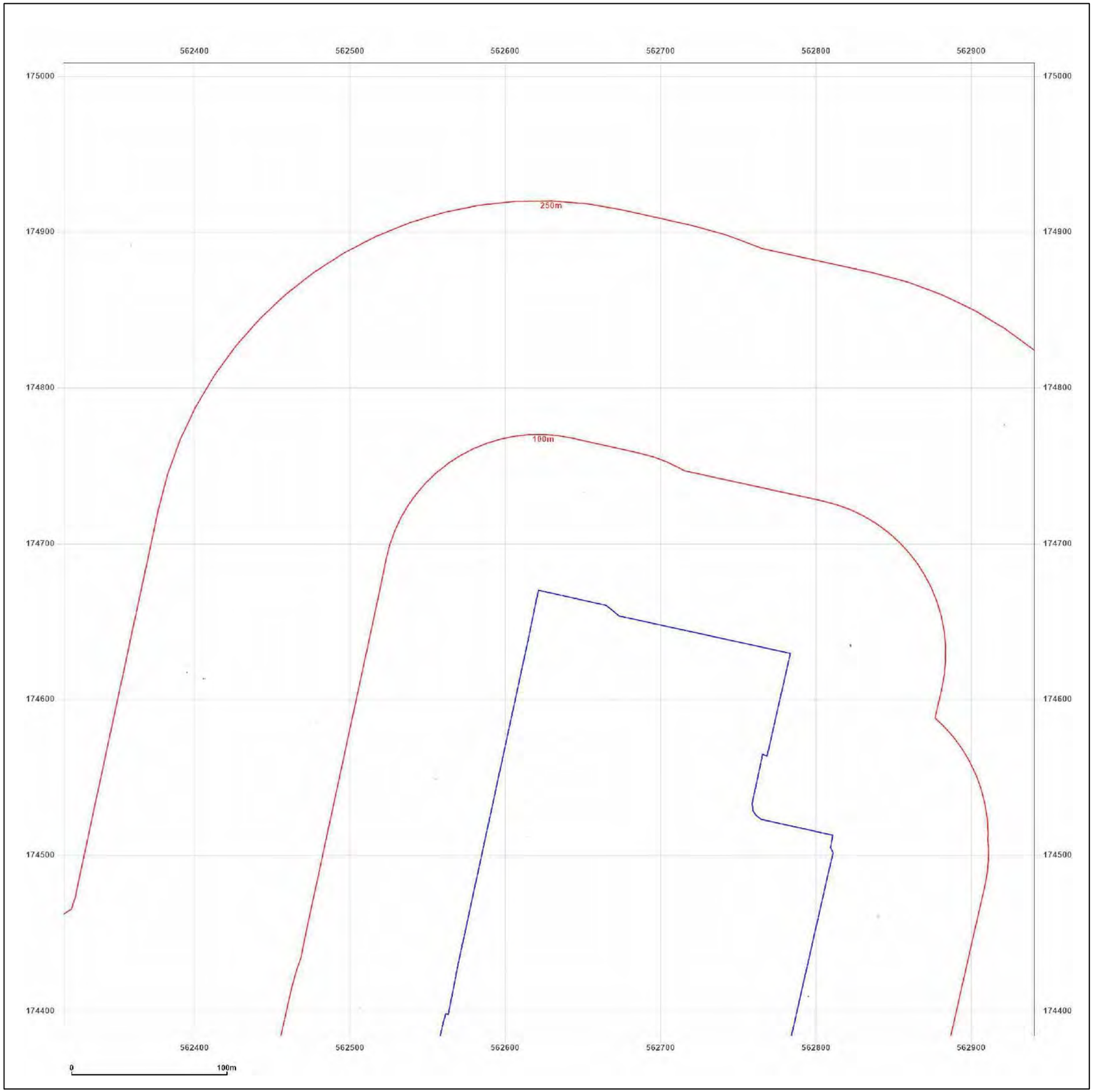

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1870**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1870
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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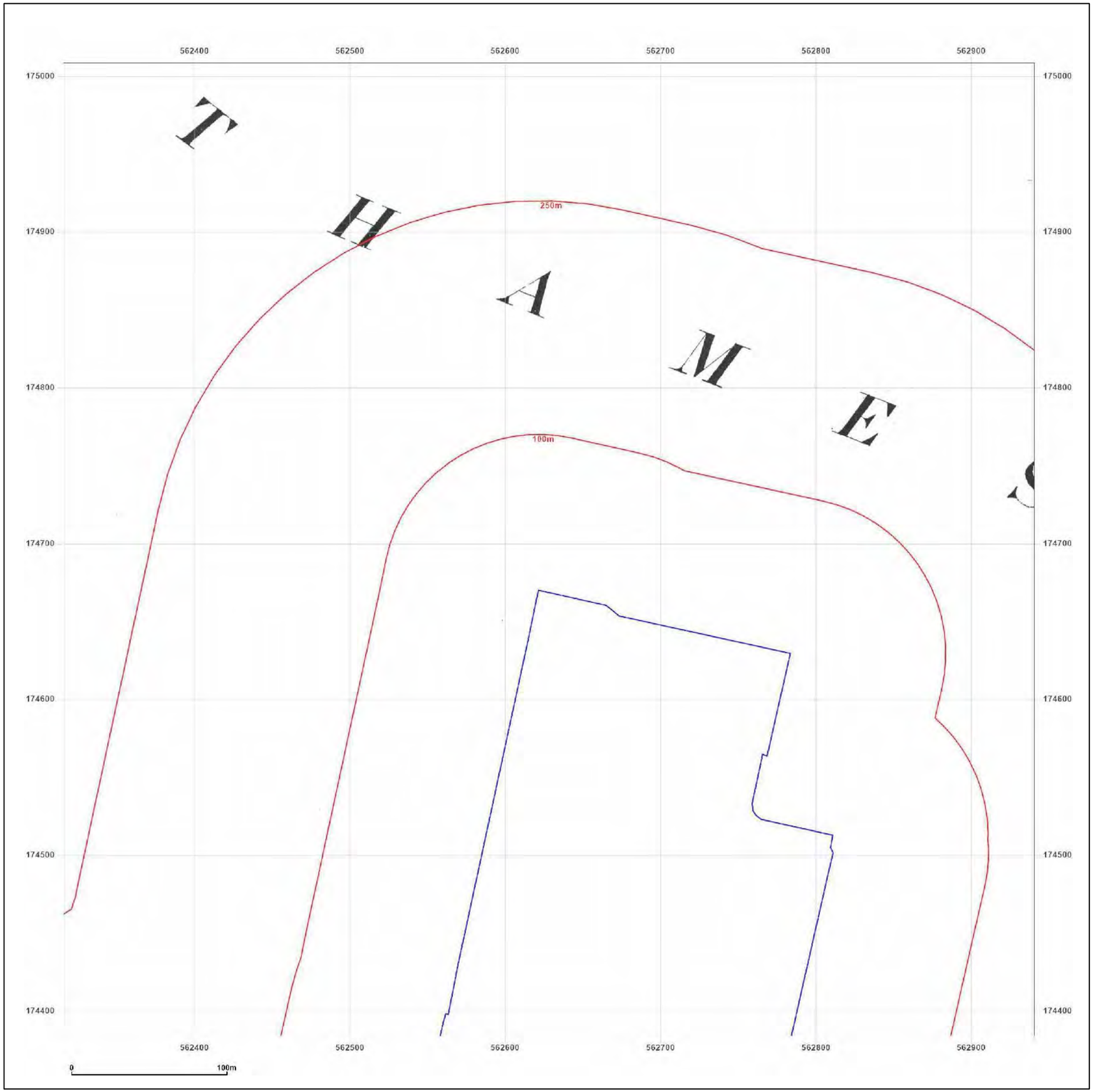

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1870**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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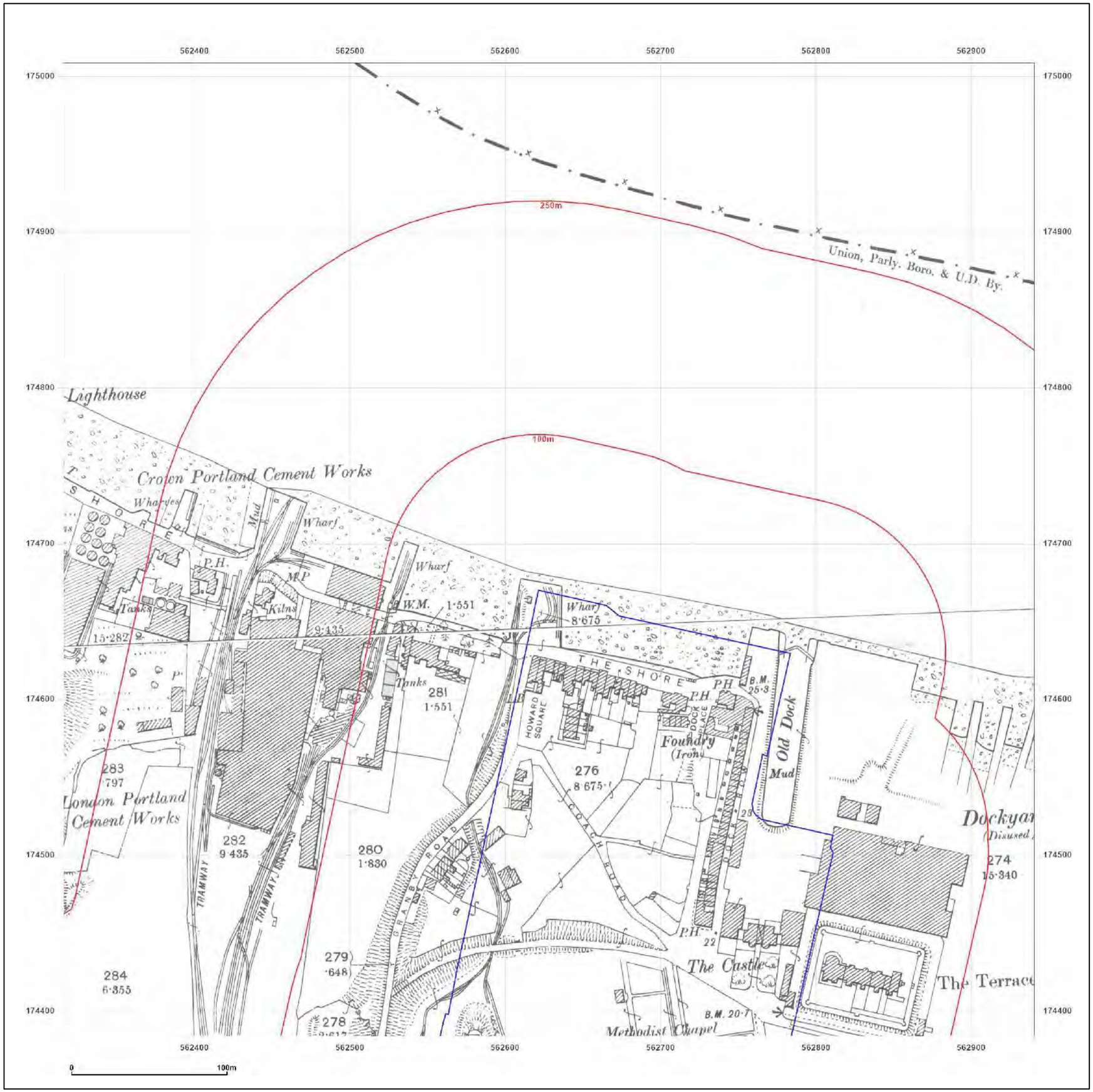

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1897-1898**
Scale: 1:2,500
Printed at: 1:2,500

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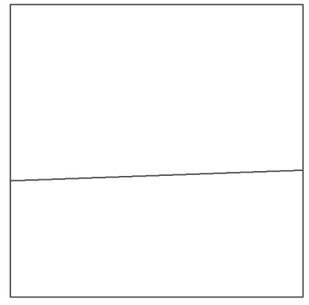
Surveyed 1898
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1897
Revised 1897
Edition N/A
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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1898**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1898
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1909**
Scale: 1:2,500
Printed at: 1:2,500

N
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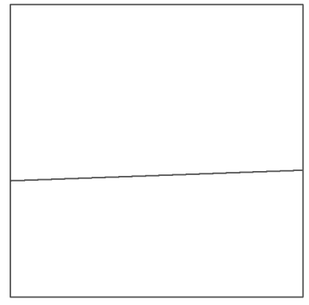
Surveyed 1909
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1909
Revised 1909
Edition N/A
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Levelled N/A

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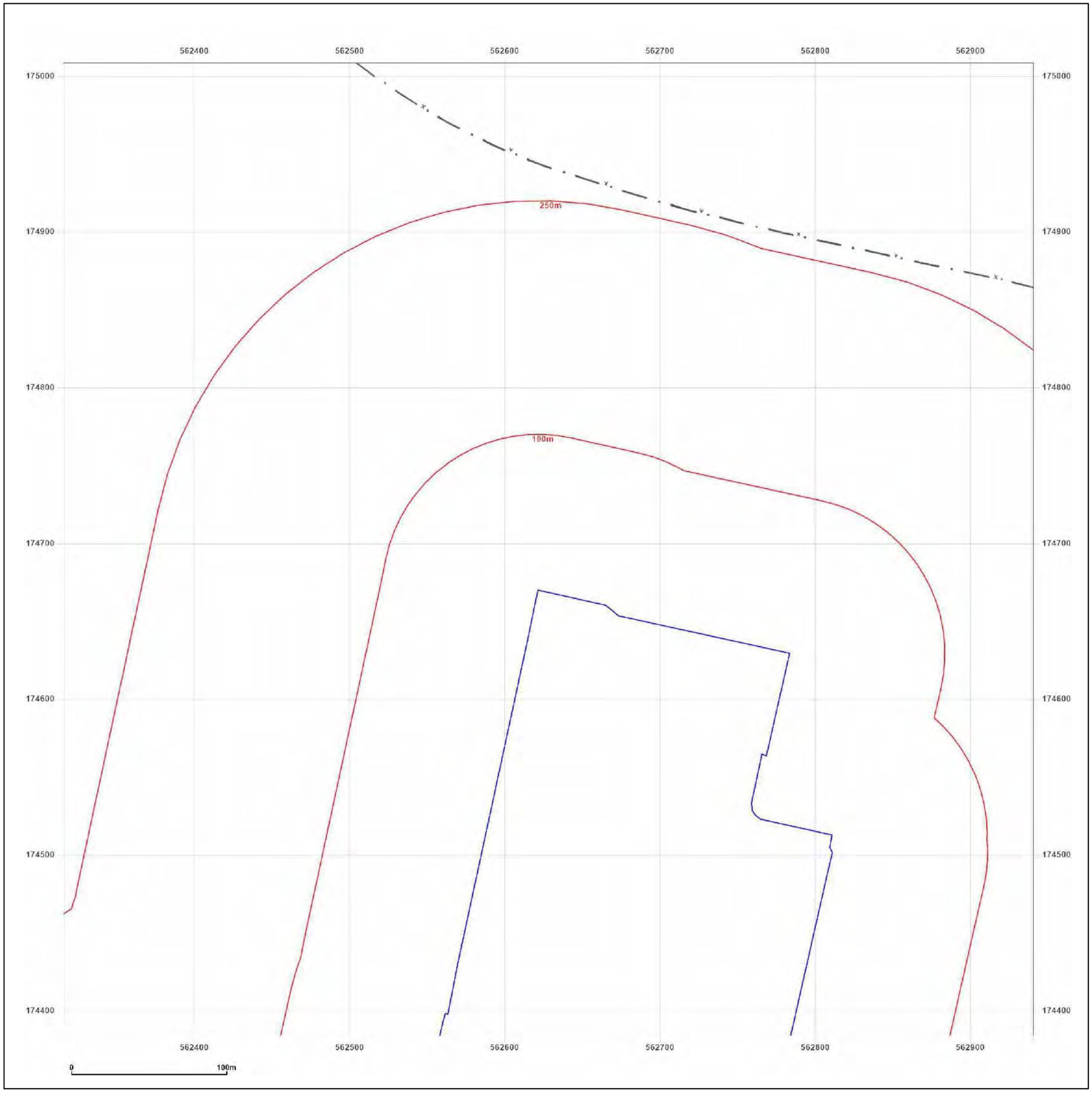

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1920**
Scale: 1:2,500
Printed at: 1:2,500

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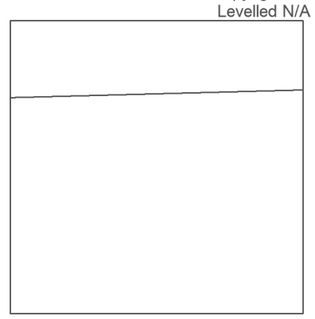
Surveyed 1920
Revised 1920
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1932-1933**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1932
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: County Series
Map date: **1939**
Scale: 1:2,500
Printed at: 1:2,500

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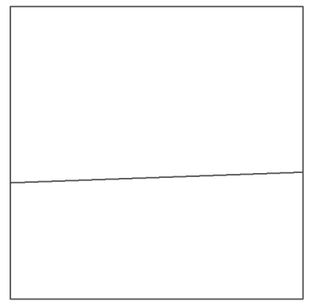
Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
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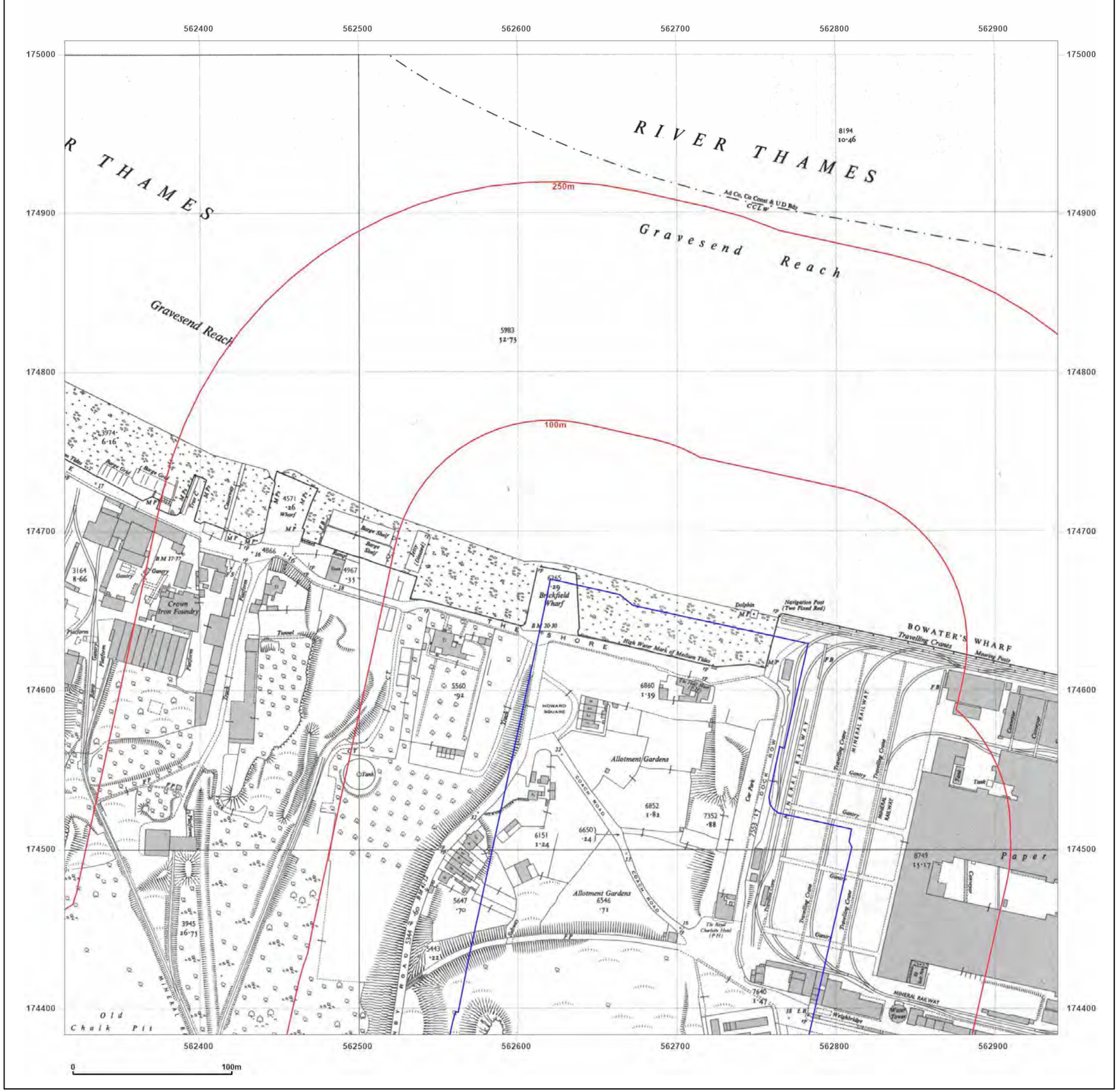

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_2
Grid Ref: 562628, 174696

Map Name: National Grid

Map date: **1951-1954**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

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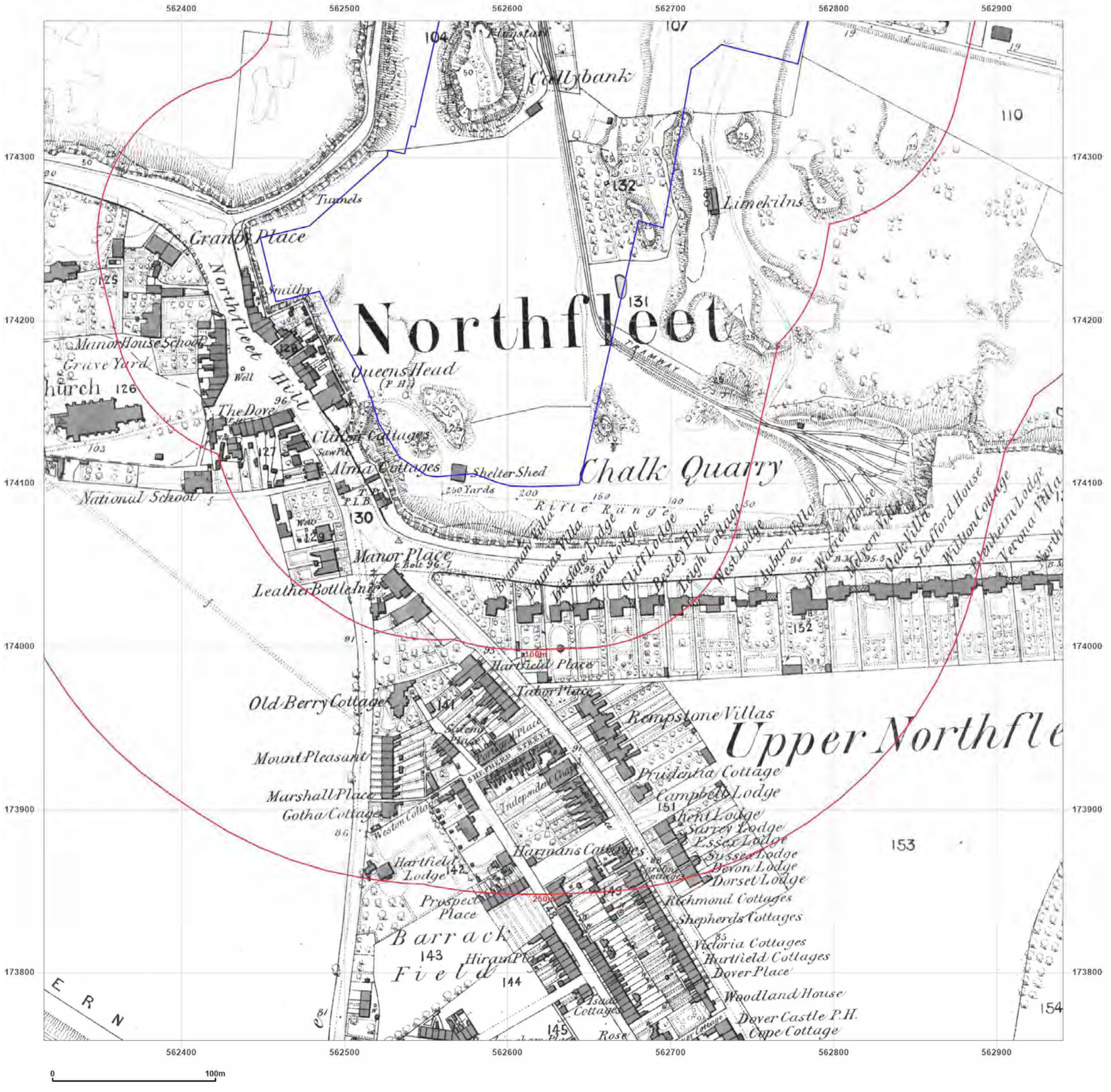

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1865**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

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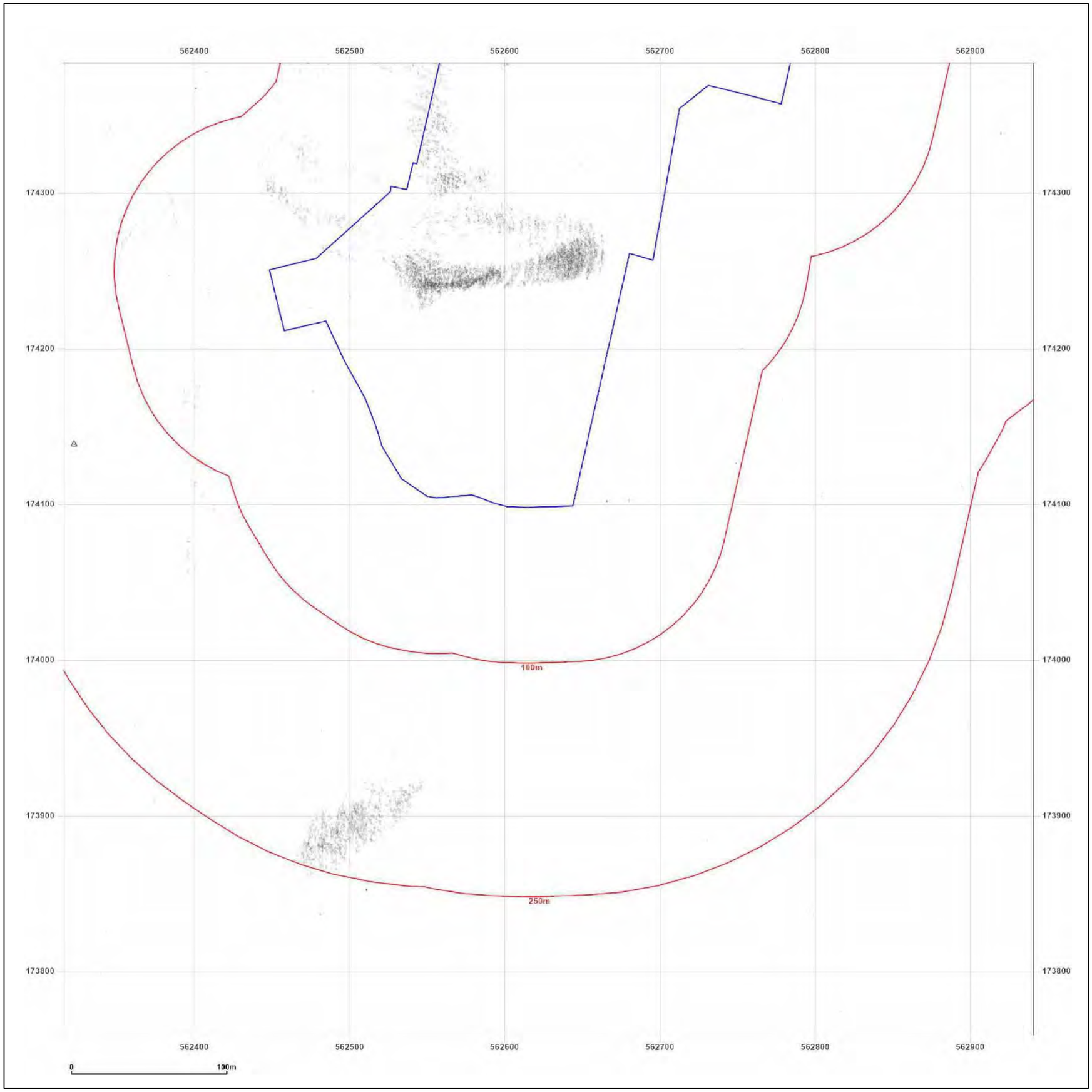

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1866**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1866
Revised 1866
Edition N/A
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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1897**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

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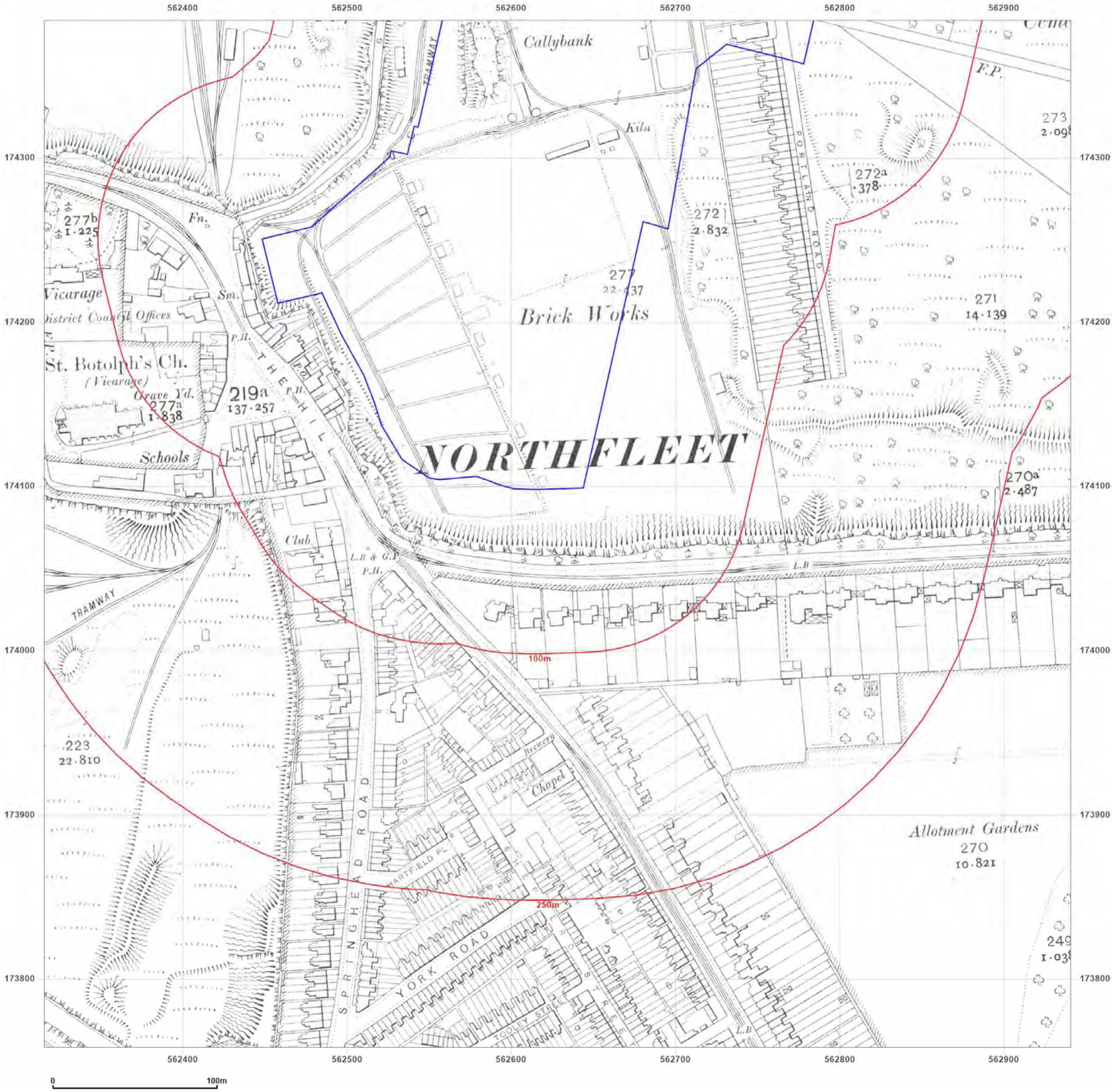

Groundsure INSIGHTS

Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1909**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1909
Revised 1909
Edition N/A
Copyright N/A
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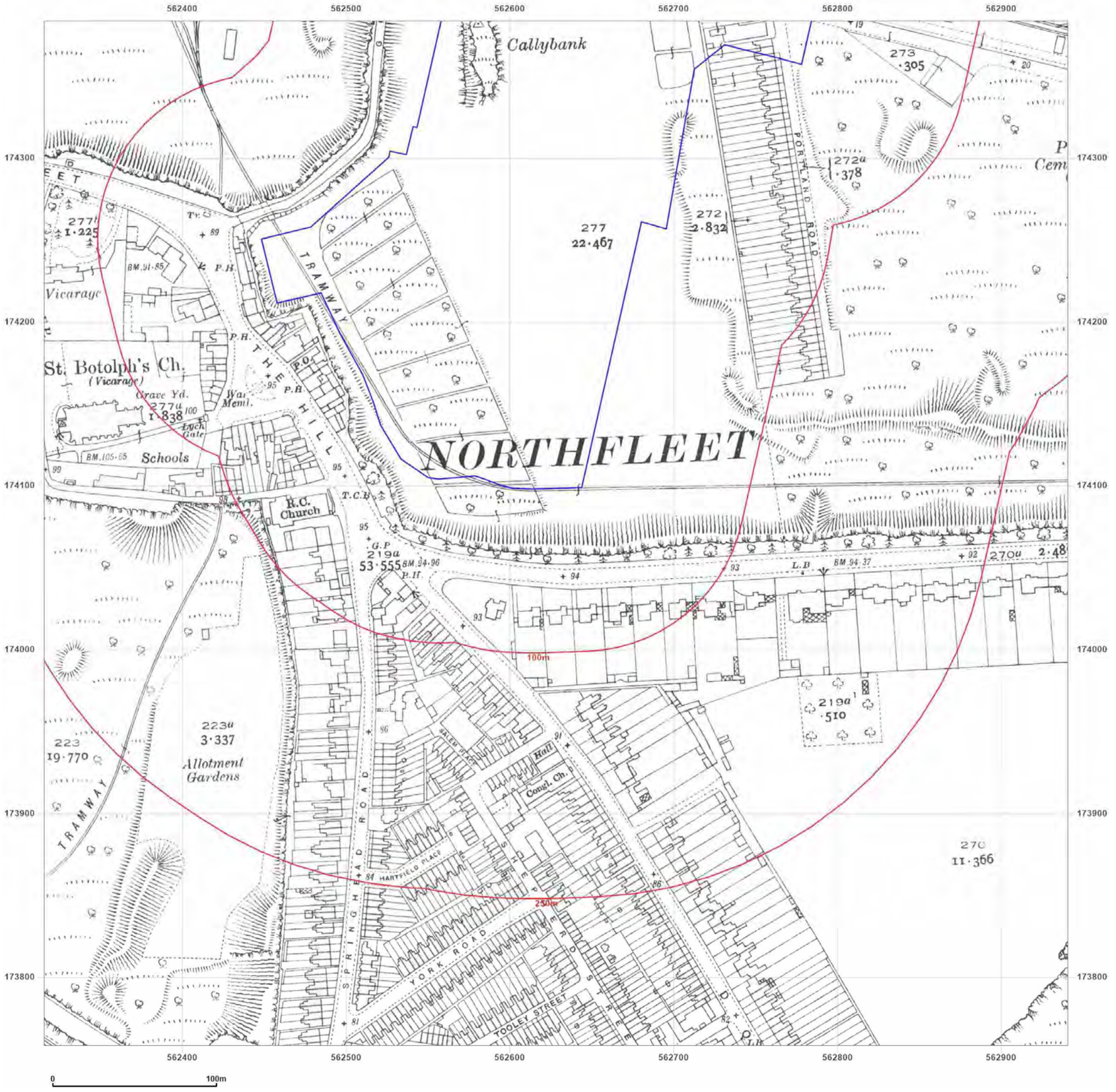

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1933**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1933
Revised 1933
Edition N/A
Copyright N/A
Levelled N/A

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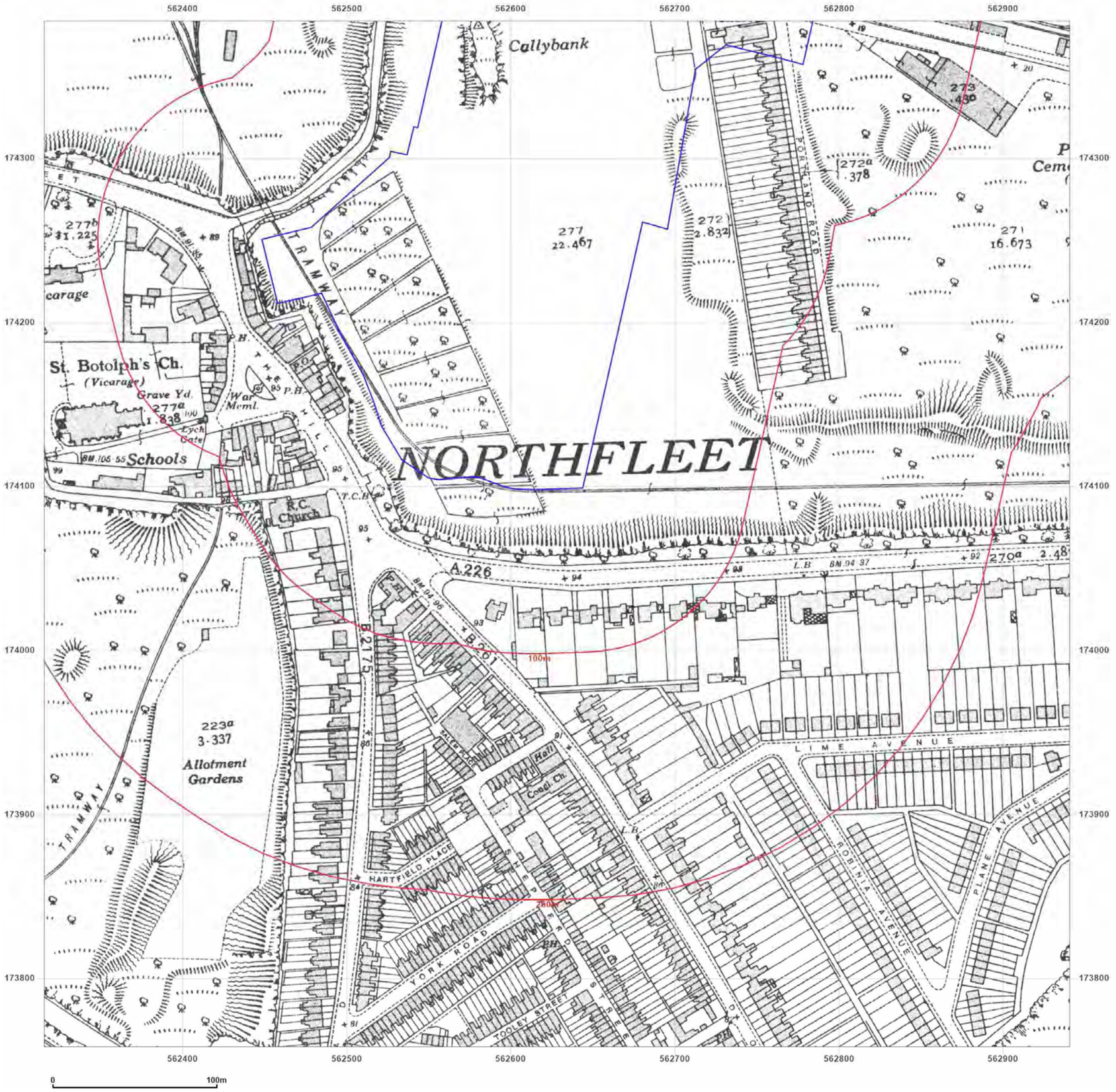

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: County Series
Map date: **1939**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A

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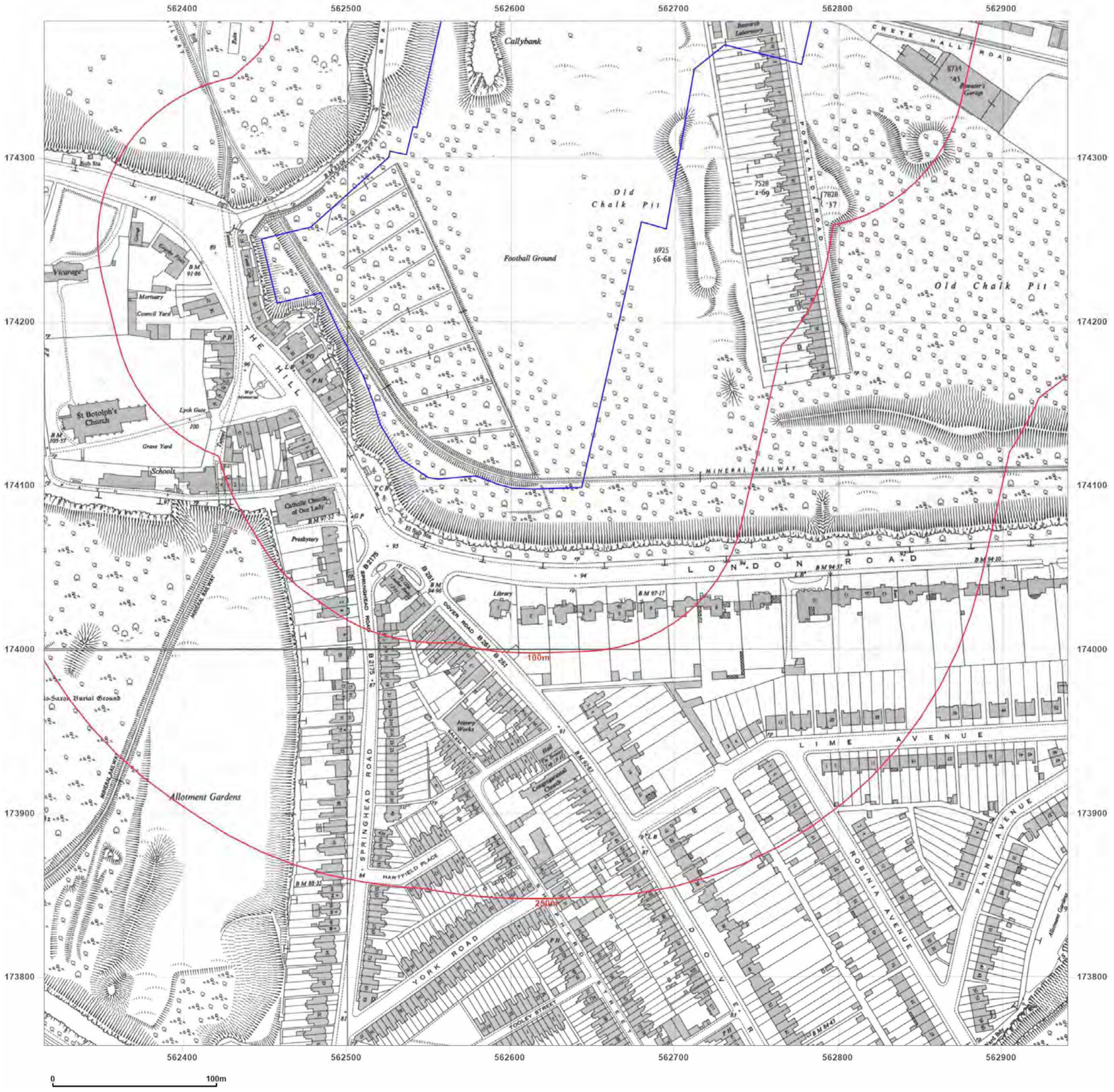

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R_LS_1_1
Grid Ref: 562628, 174071

Map Name: National Grid

Map date: **1954**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

Surveyed 1952
Revised 1952
Edition 1954
Copyright N/A
Levelled 1952

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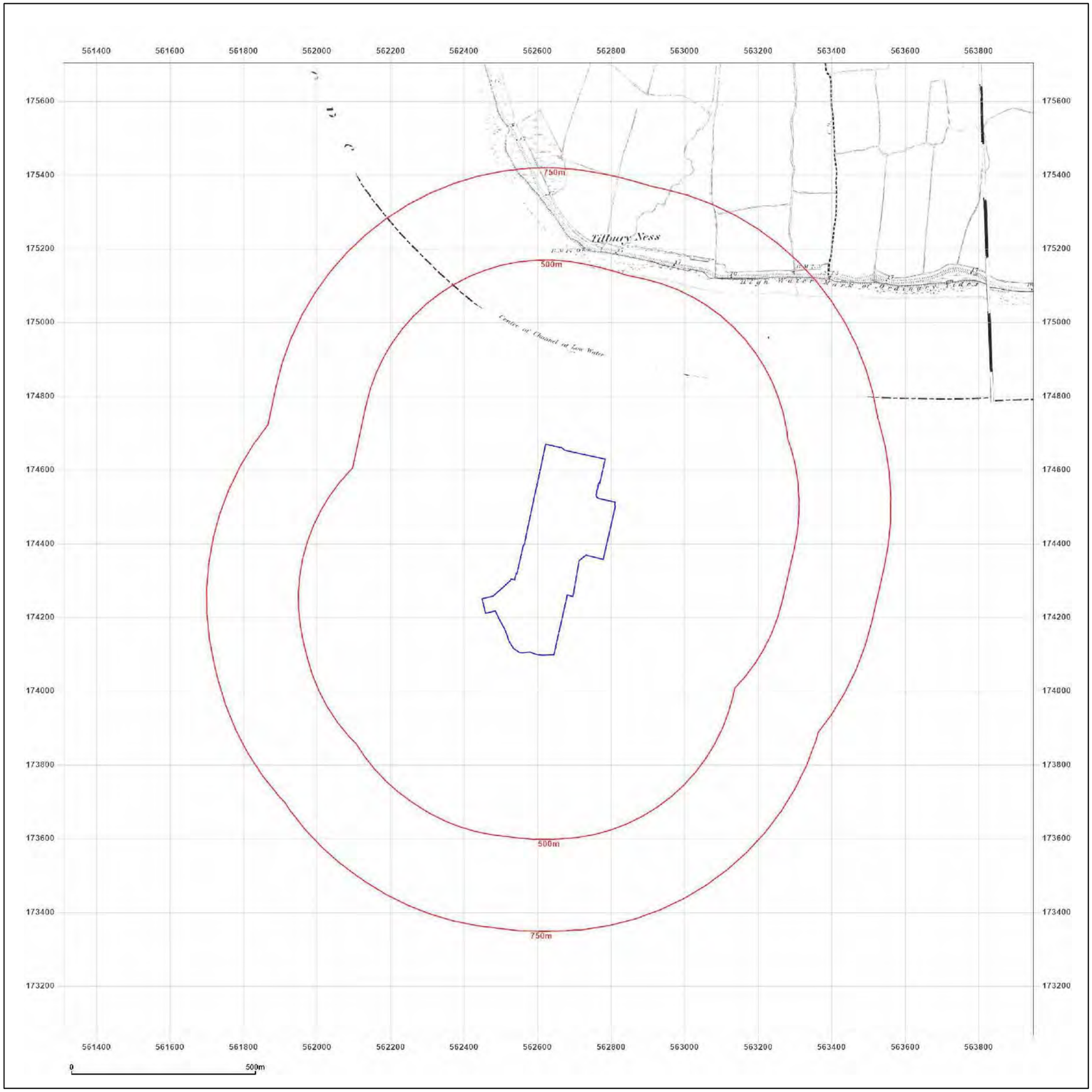

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1863**
Scale: 1:10,560
Printed at: 1:10,560

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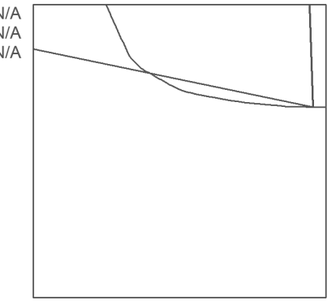
Surveyed 1863
Revised 1863
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1863
Revised 1863
Edition N/A
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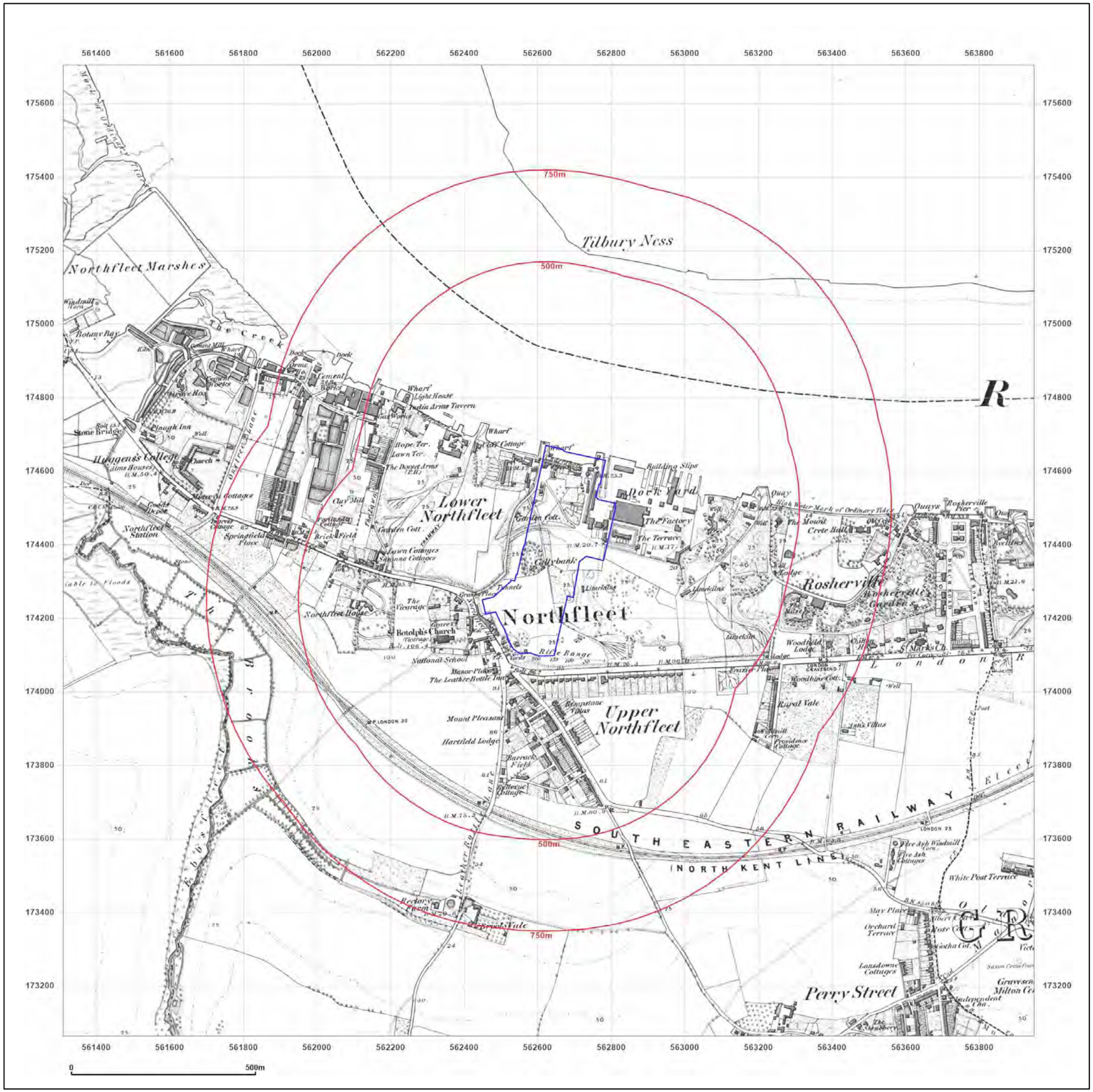

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1865**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 11 May 2023

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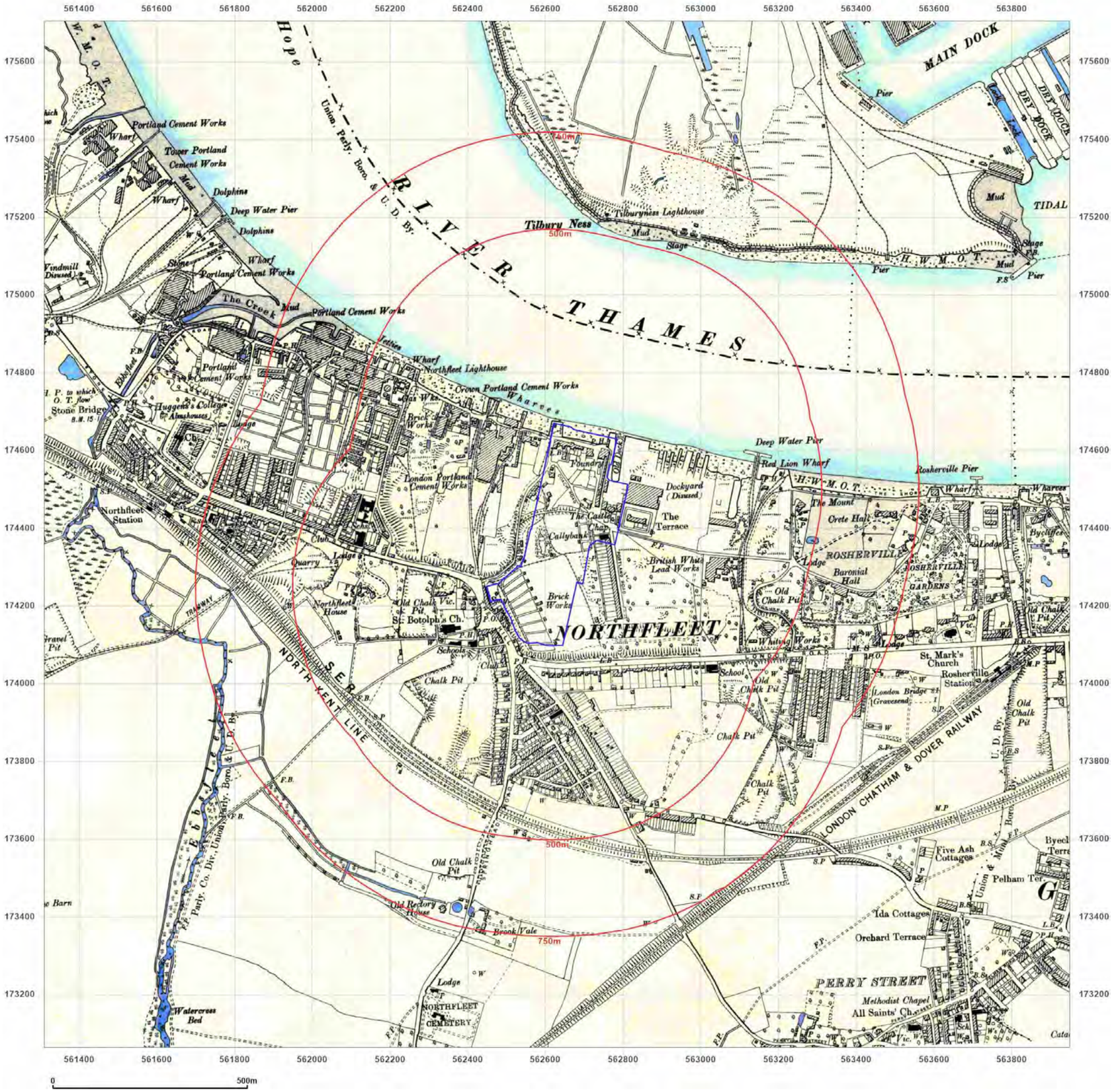

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series

Map date: **1895**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1864
Revised 1895
Edition N/A
Copyright N/A
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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series

Map date: **1895**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1864
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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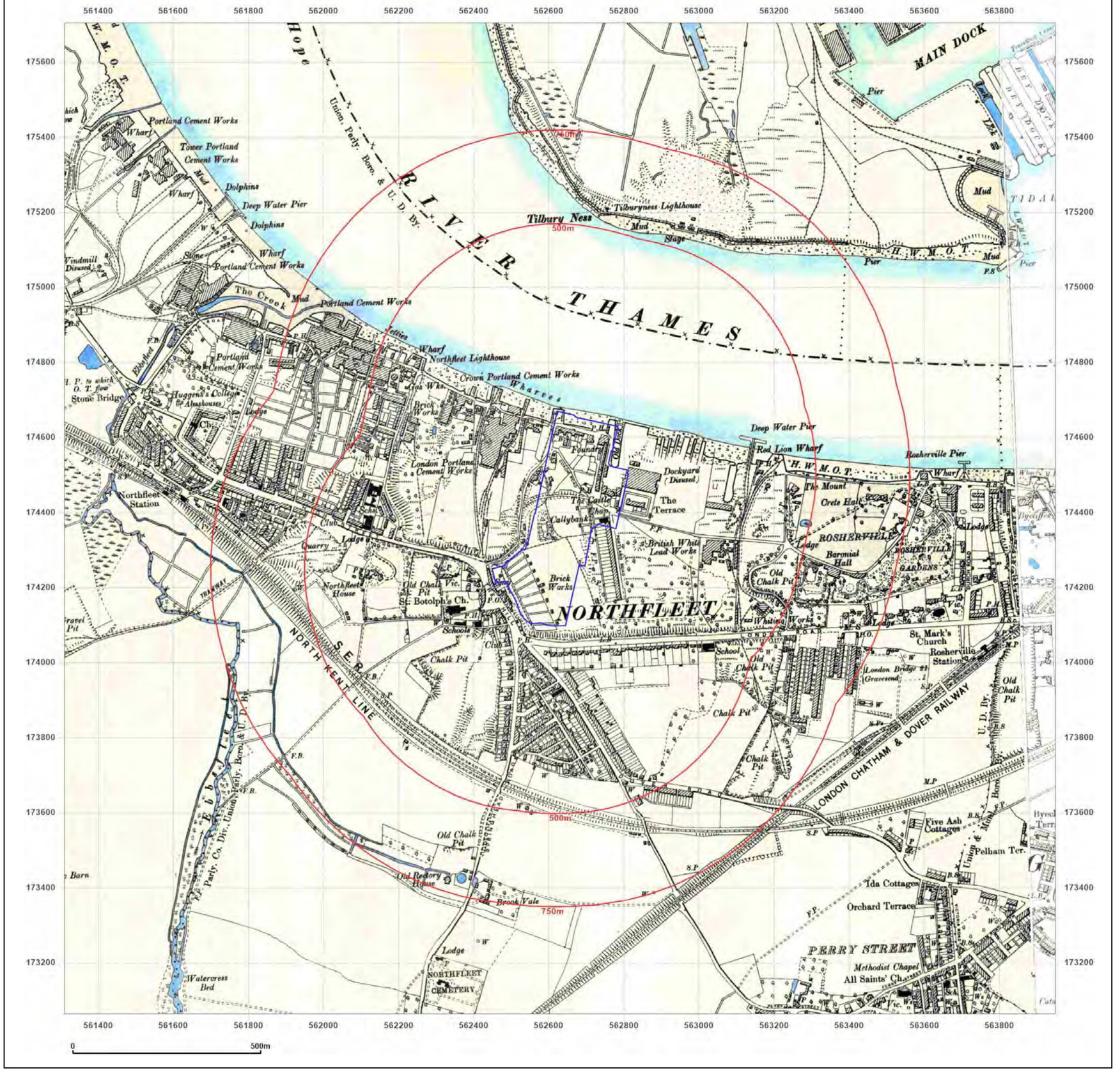

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series

Map date: **1895-1898**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1862
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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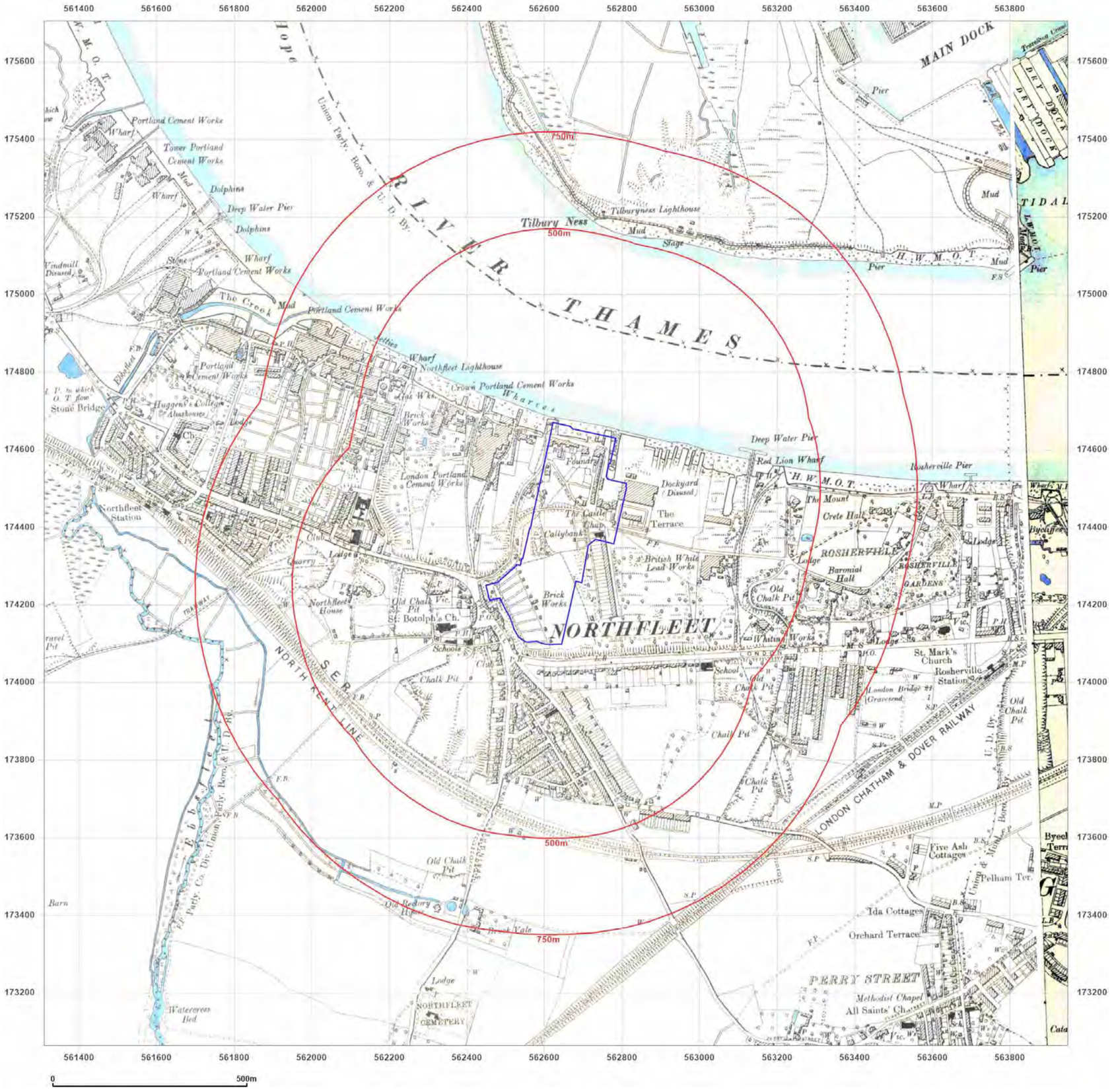

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series

Map date: **1895-1899**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1864
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1866
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

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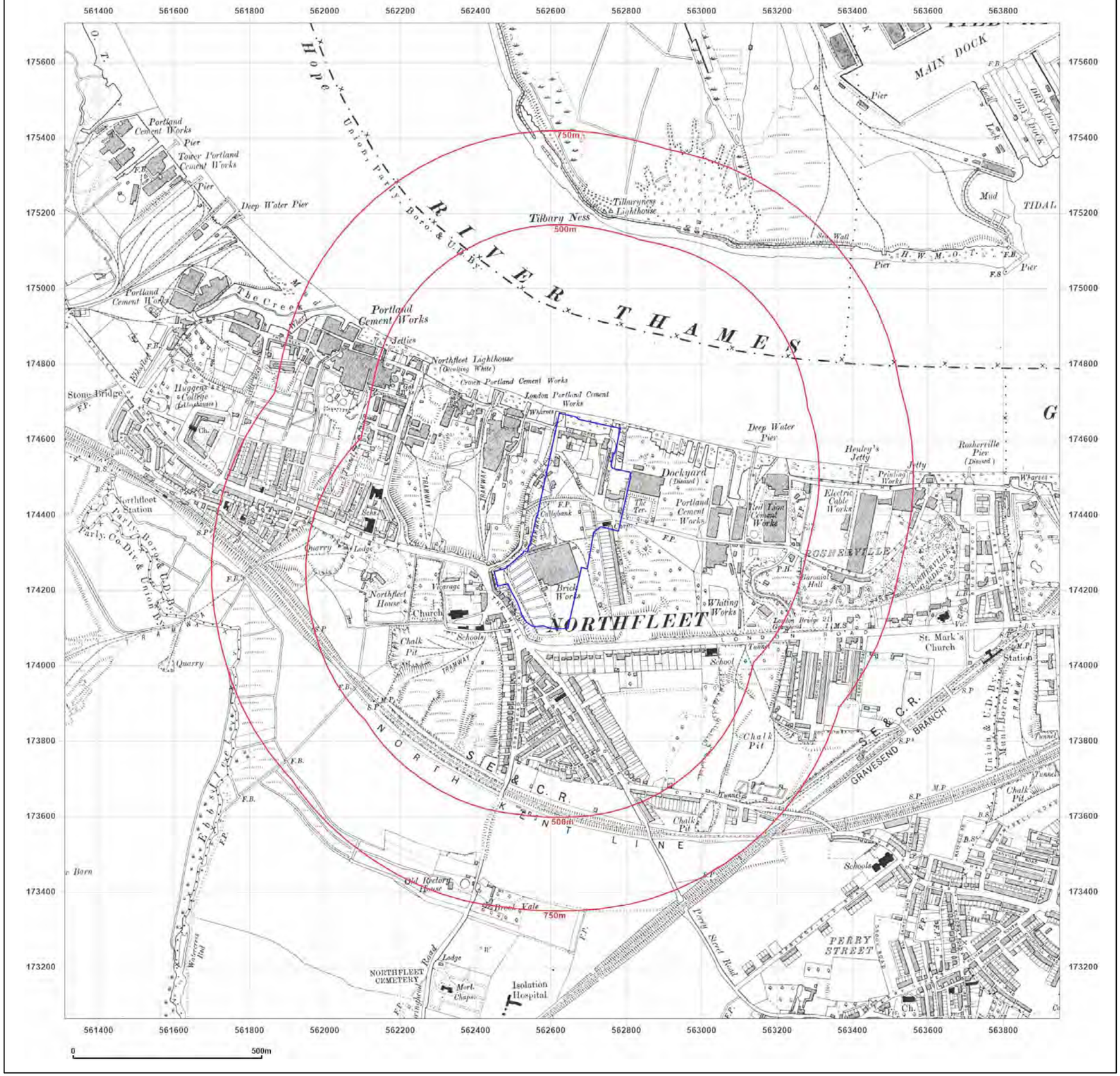

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1907**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1864
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

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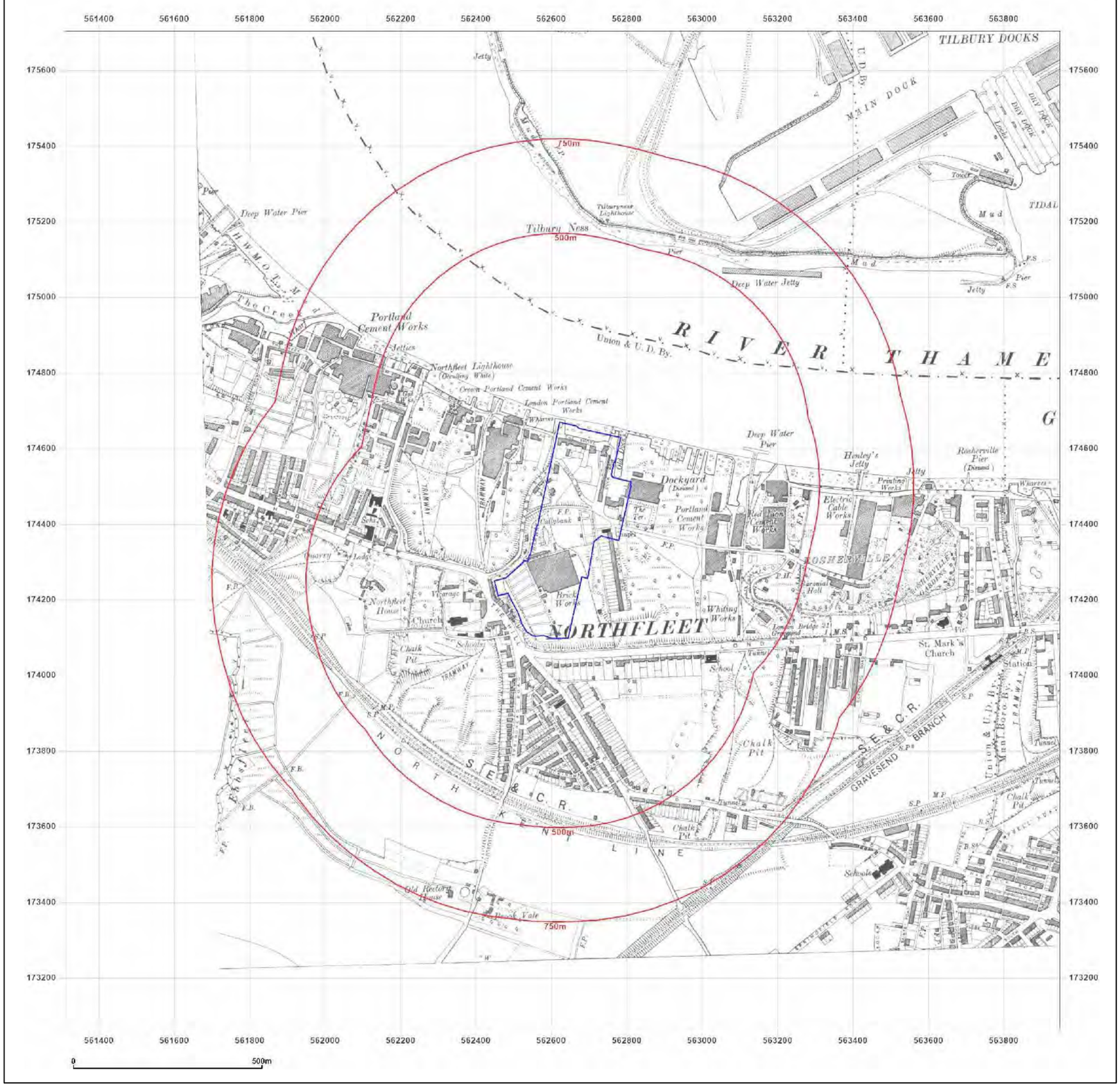

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1916**
Scale: 1:10,560
Printed at: 1:10,560

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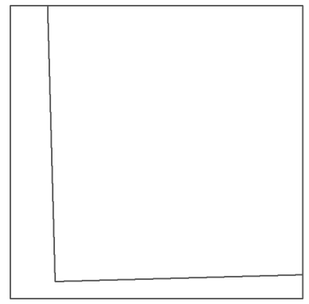

Surveyed 1864
Revised 1916
Edition N/A
Copyright N/A
Levelled N/A

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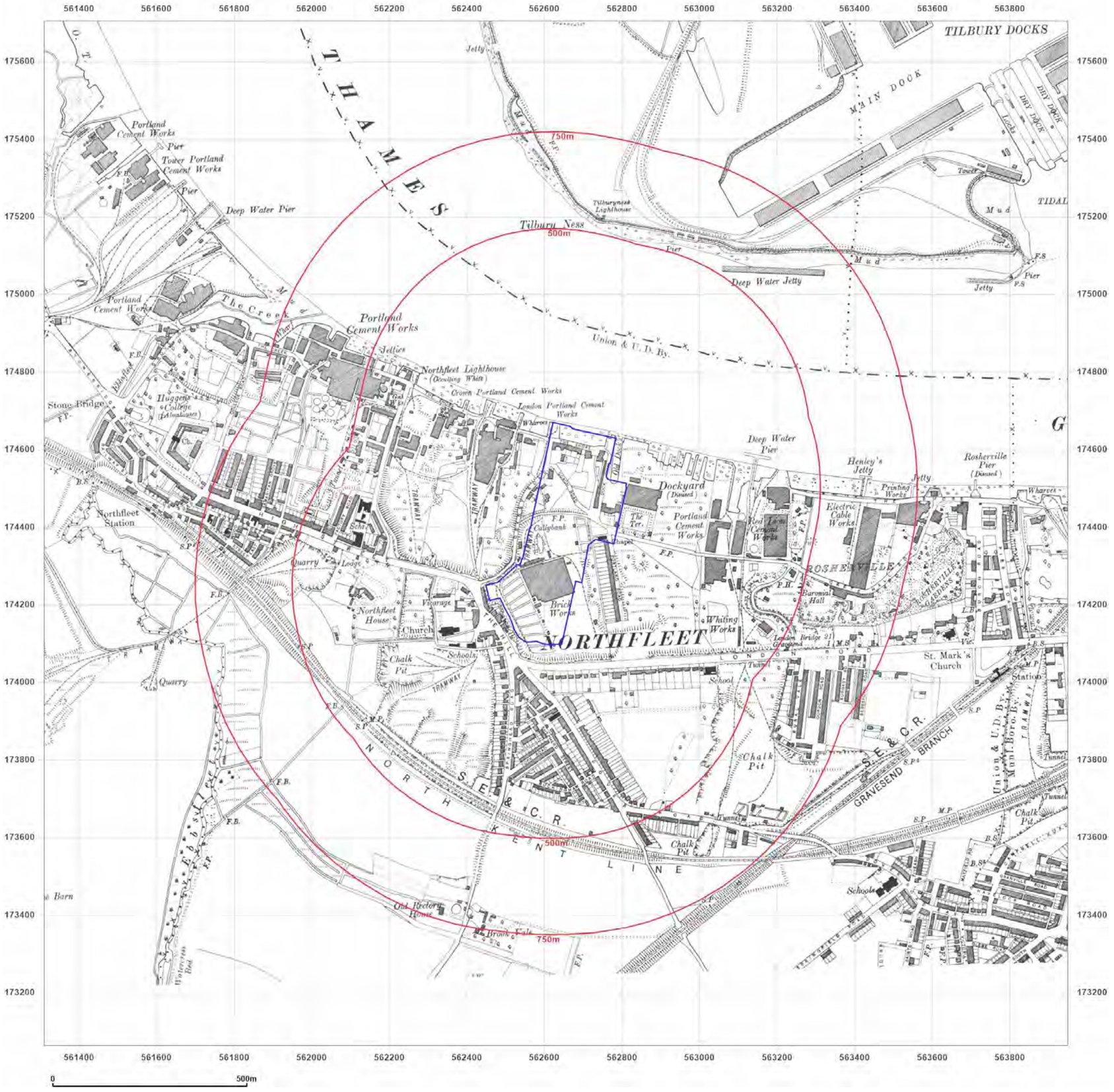

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1923**
Scale: 1:10,560
Printed at: 1:10,560

N
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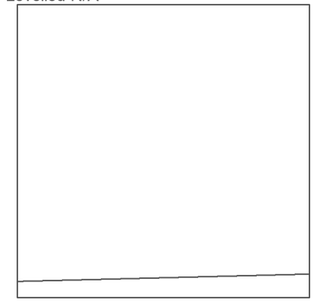
Surveyed 1864
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A



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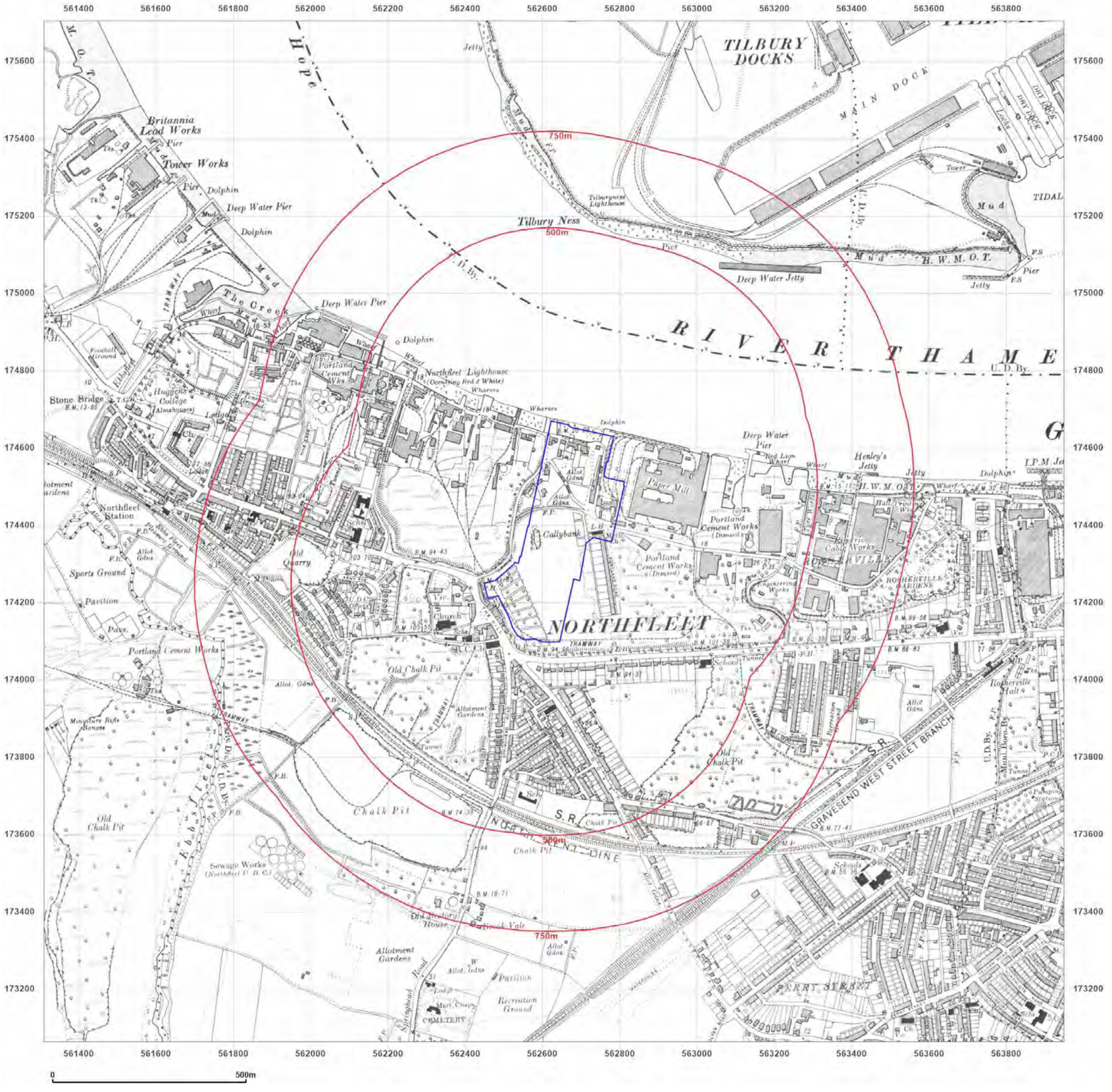

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1931-1932**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1864
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

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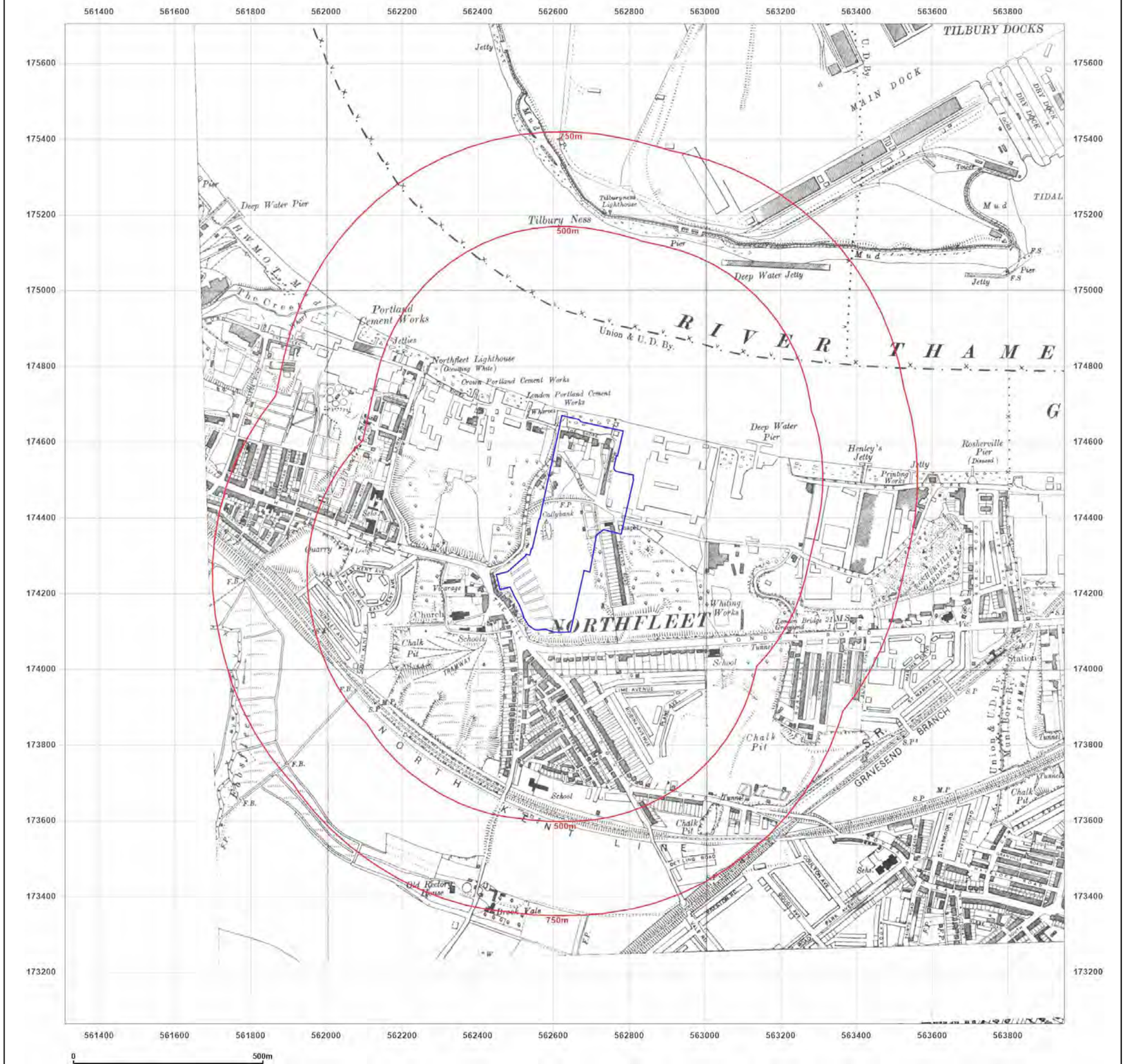

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1938**
Scale: 1:10,560
Printed at: 1:10,560

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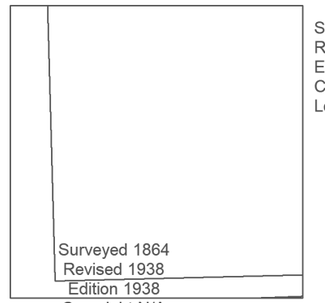

Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

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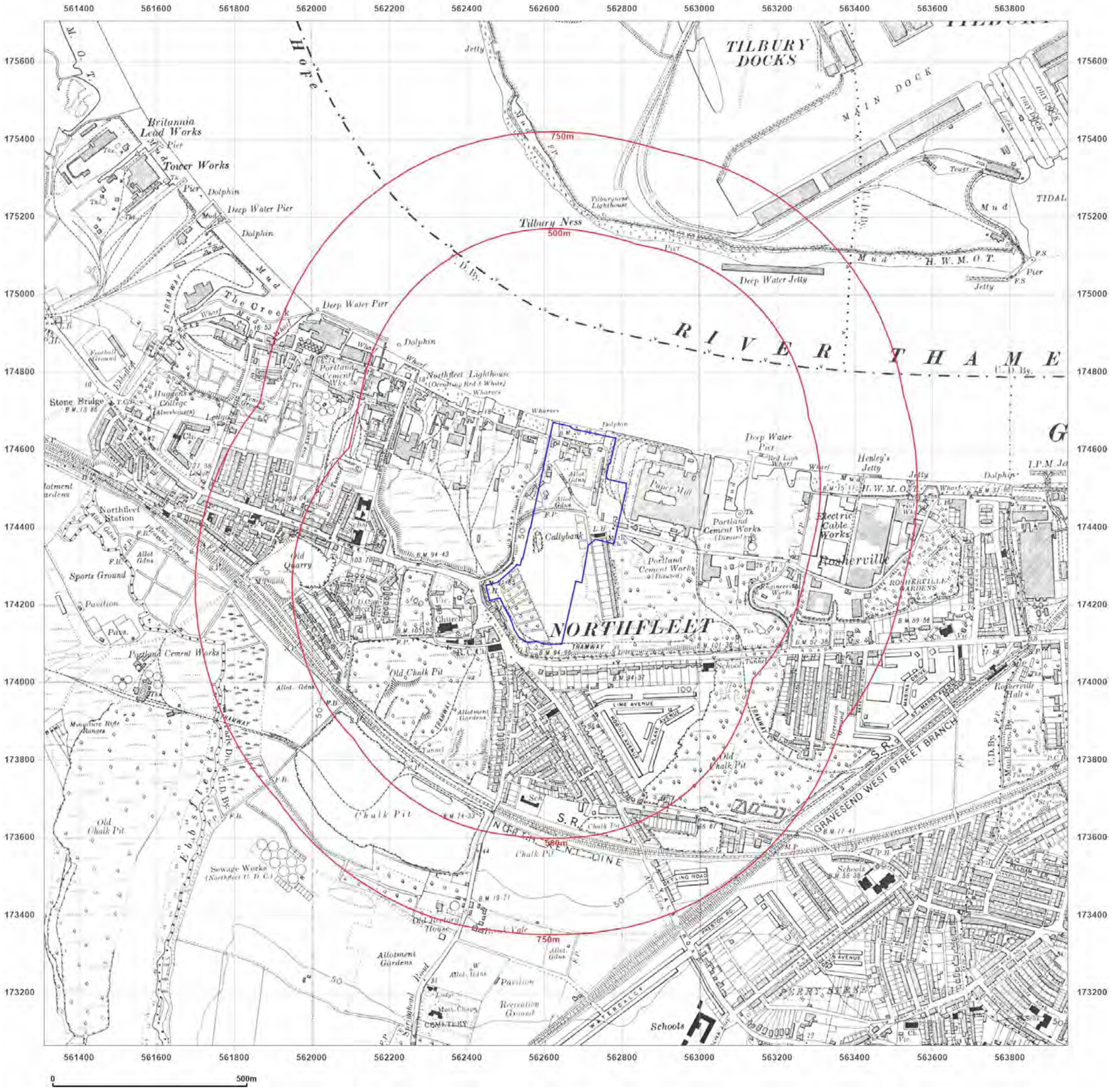

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1864
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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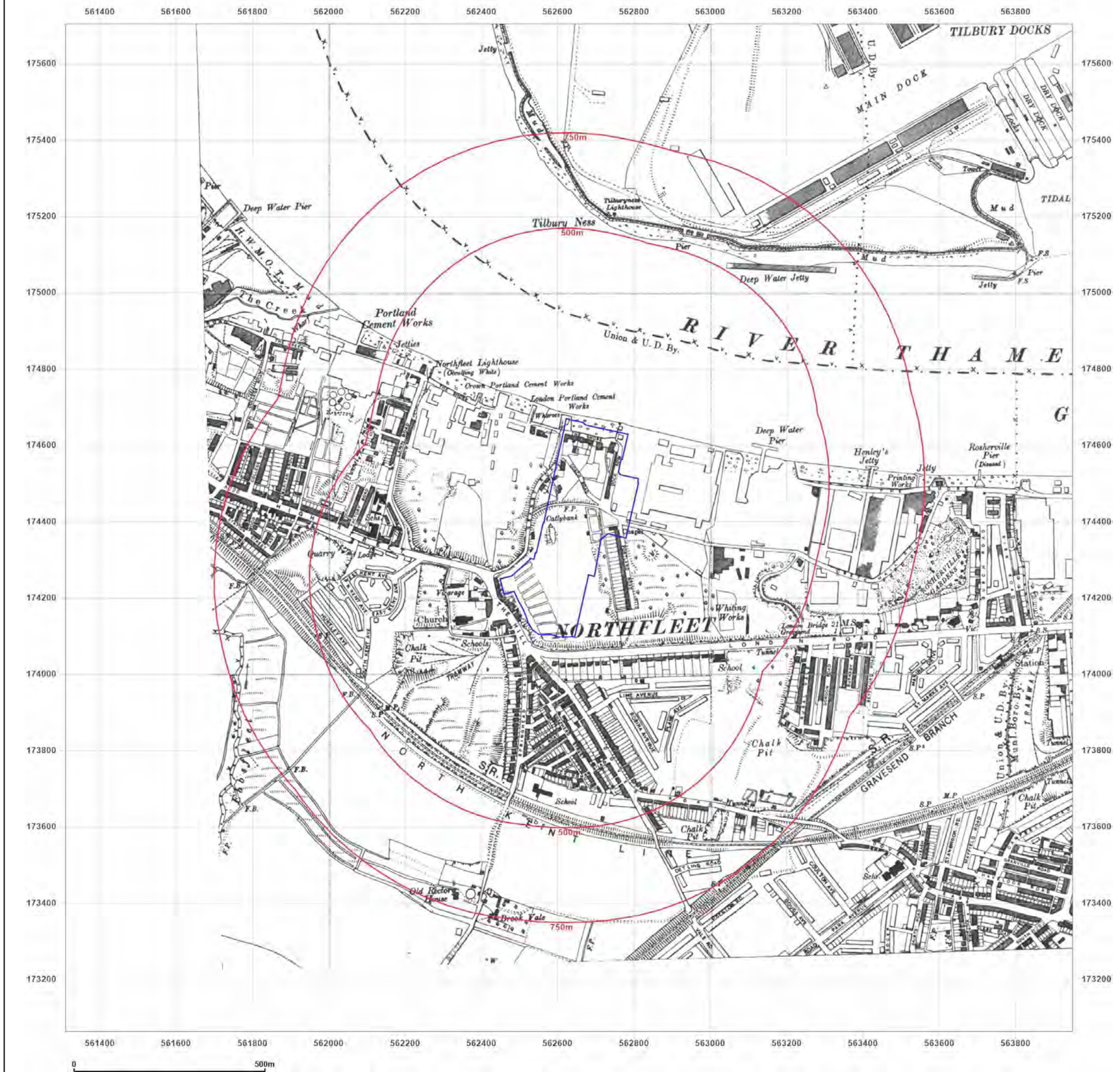

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1938**
Scale: 1:10,560
Printed at: 1:10,560

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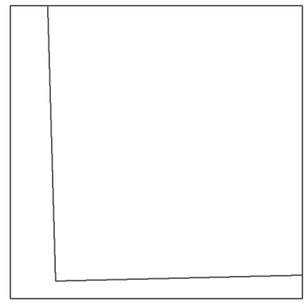

Surveyed 1866
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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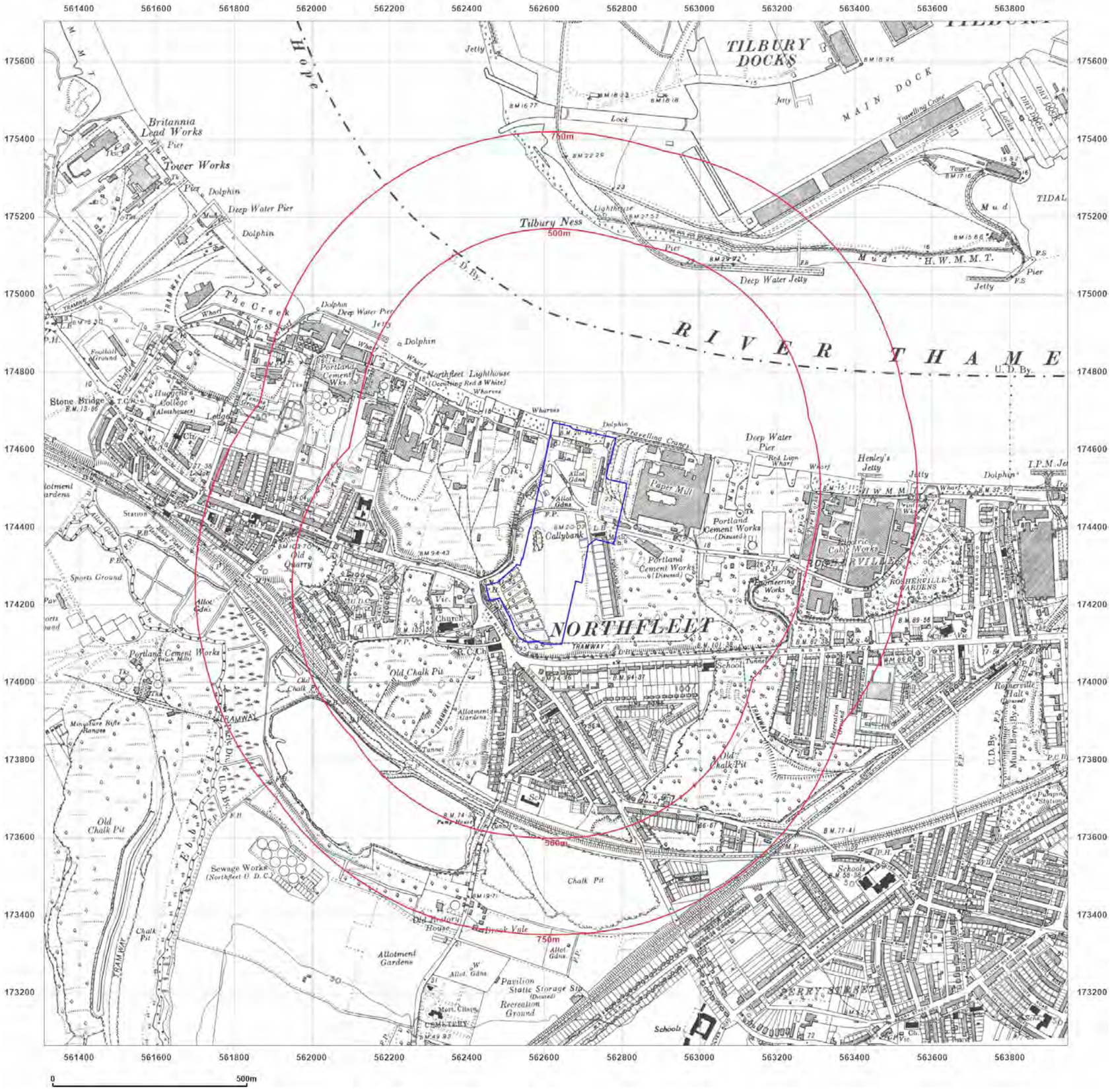

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: County Series
Map date: **1946**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1864
Revised 1946
Edition N/A
Copyright N/A
Levelled N/A

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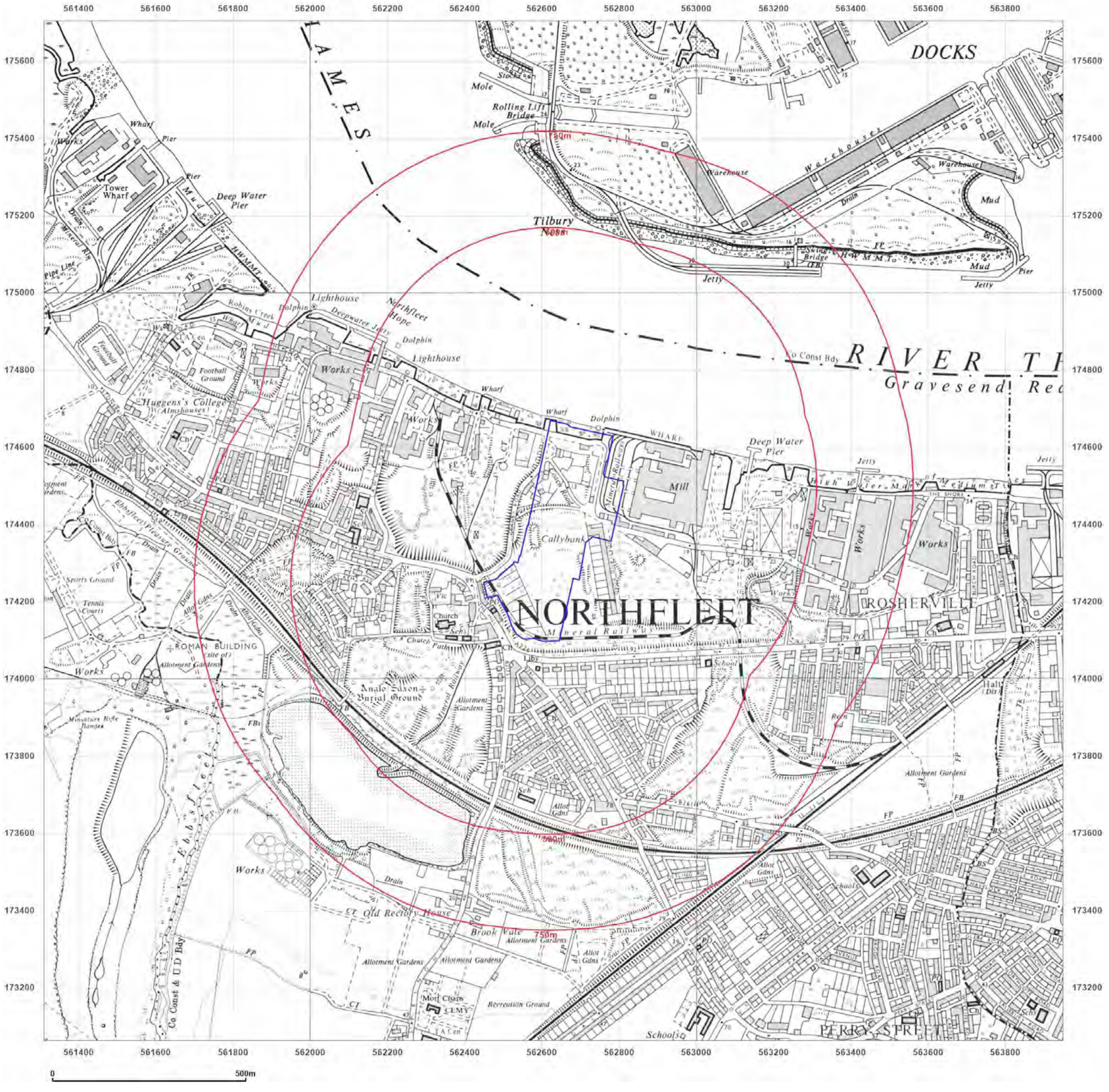

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: Provisional
Map date: **1955**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1864
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1864
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

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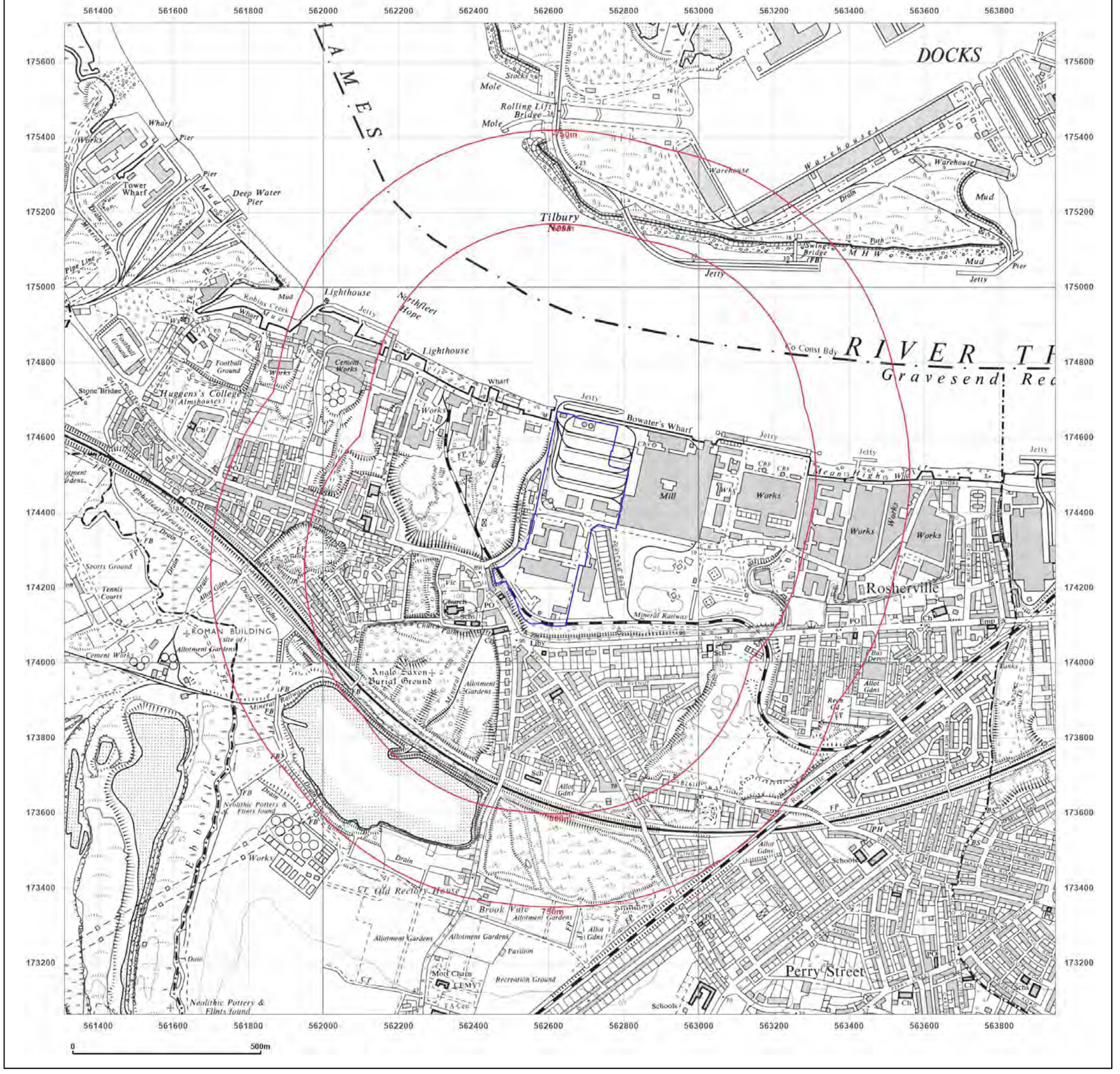

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: Provisional
Map date: **1966**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

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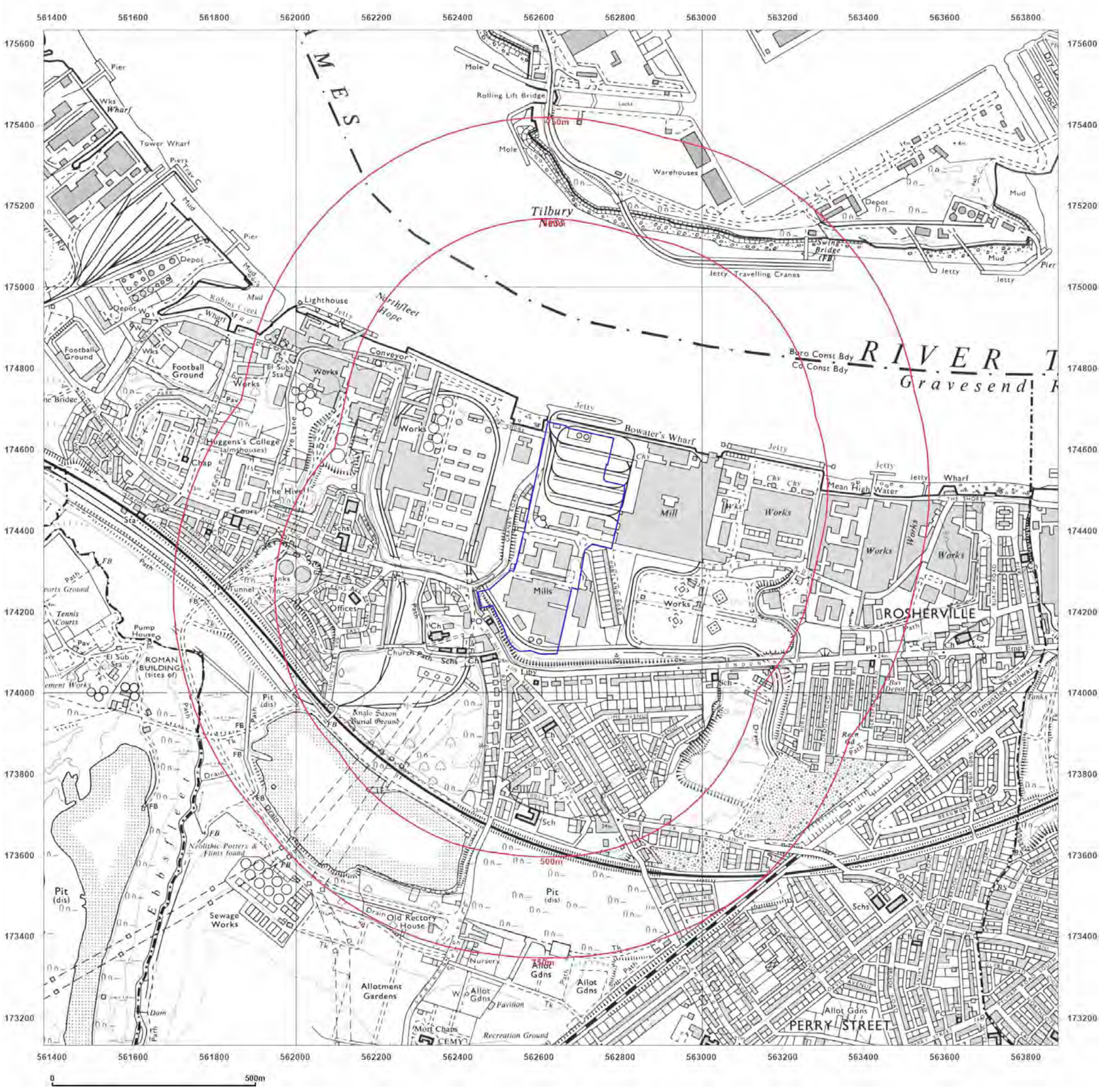

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid

Map date: **1971-1973**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1973
Revised 1973
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1971
Revised 1971
Edition N/A
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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid

Map date: **1977-1982**

Scale: 1:10,000

Printed at: 1:10,000

N W E S

Surveyed 1981
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1977
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A

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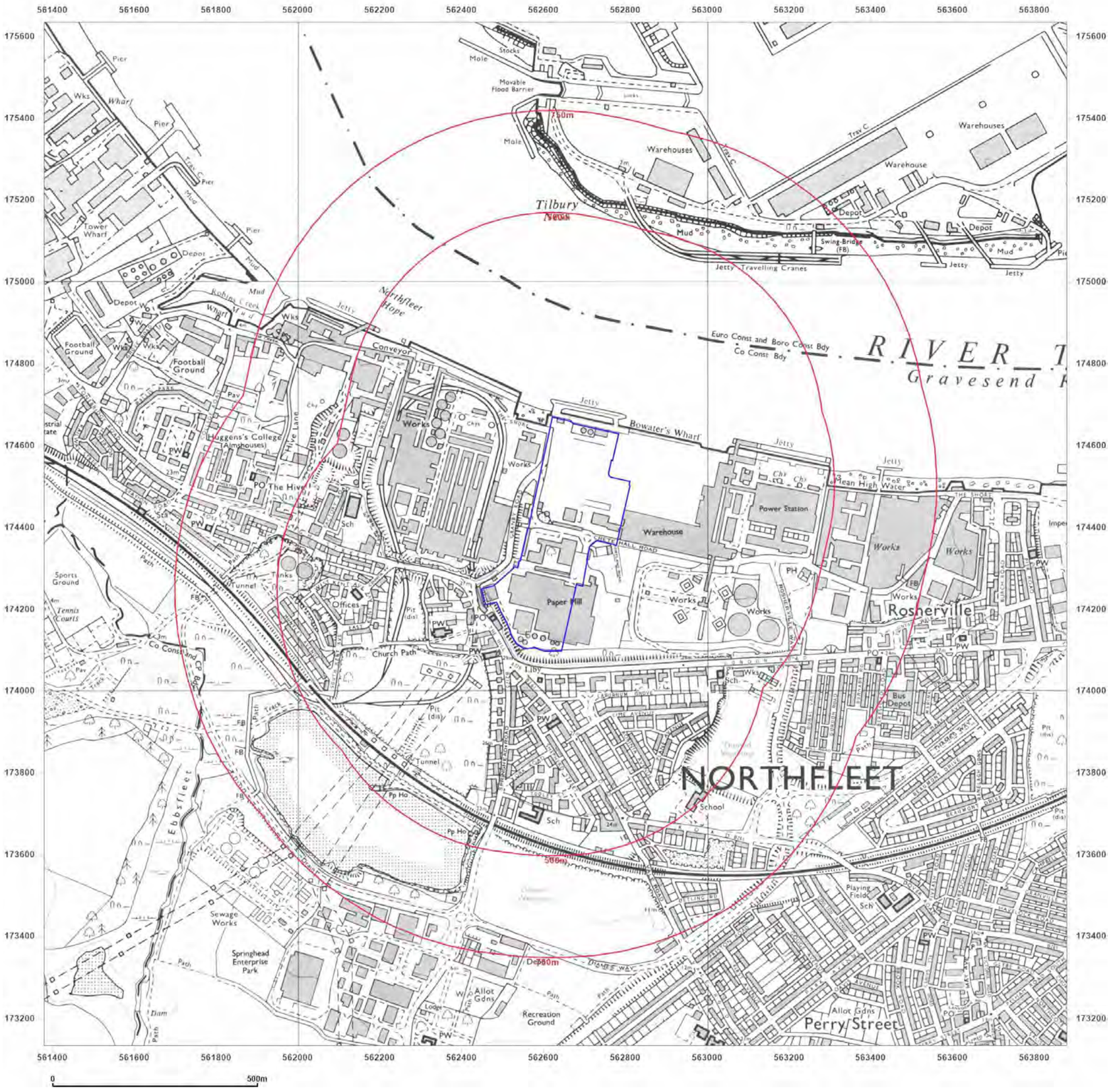

Groundsure INSIGHTS

Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid

Map date: **1990-1992**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1981
Revised 1992
Edition N/A
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Surveyed 1988
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

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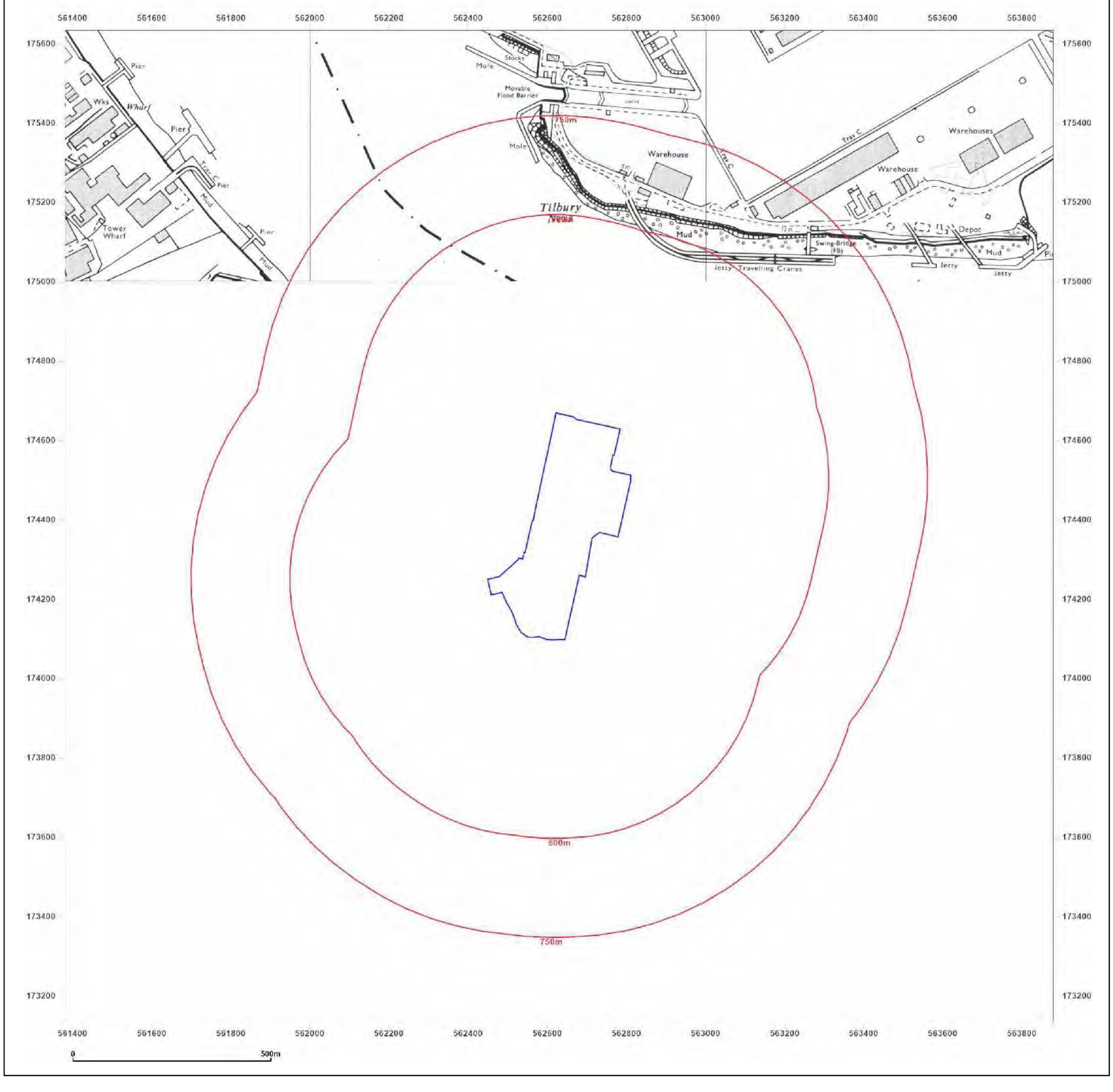

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid
Map date: **1993**
Scale: 1:10,000
Printed at: 1:10,000

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid
Map date: **2001**
Scale: 1:10,000
Printed at: 1:10,000

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Site Details:

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Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

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Site Details:

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Client Ref: G_22_049_PONo203
Report Ref: GS-XIR-LDG-629-O6R
Grid Ref: 562629, 174384

Map Name: National Grid
Map date: **2023**
Scale: 1:10,000
Printed at: 1:10,000

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Appendix C

Environmental Data

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

TANK 249M FROM KIMBERLY CLARK LTD, NORTHFLEET MILL, CRETE HALL ROAD 23M FROM UNNAMED ROAD, CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9AD

Order Details

Date: 10/05/2023

Your ref: G_22_049_PONo203

Our Ref: GS-KHL-FVQ-DA4-TKD

Site Details

Location: 562676 174415

Area: 10.14 ha

Authority: Gravesham Borough Council ↗

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Summary of findings p. 2 >

OS MasterMap site plan N/A: >10ha

Aerial image p. 8 >

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Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
13 >	1.1 >	Historical industrial land uses >	80	56	155	350	-
37 >	1.2 >	Historical tanks >	14	1	21	59	-
40 >	1.3 >	Historical energy features >	1	1	36	25	-
43 >	1.4 >	Historical petrol stations >	0	0	0	0	-
43 >	1.5 >	Historical garages >	0	1	1	4	-
44 >	1.6 >	Historical military land >	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
45 >	2.1 >	Historical industrial land uses >	114	66	218	463	-
76 >	2.2 >	Historical tanks >	19	1	32	88	-
82 >	2.3 >	Historical energy features >	2	1	50	34	-
85 >	2.4 >	Historical petrol stations >	0	0	0	0	-
85 >	2.5 >	Historical garages >	0	2	3	5	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
87 >	3.1 >	Active or recent landfill >	0	0	0	0	-
87 >	3.2 >	Historical landfill (BGS records) >	1	0	0	0	-
88 >	3.3 >	Historical landfill (LA/mapping records) >	0	0	0	2	-
88 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	3	-
89 >	3.5 >	Historical waste sites >	0	0	0	0	-
89 >	3.6 >	Licensed waste sites >	0	0	0	5	-
91 >	3.7 >	Waste exemptions >	1	4	10	2	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
94 >	4.1 >	Recent industrial land uses >	10	4	23	-	-
96 >	4.2 >	Current or recent petrol stations >	0	0	0	0	-
97 >	4.3 >	Electricity cables >	0	9	18	7	-
99 >	4.4 >	Gas pipelines >	0	0	0	0	-
100 >	4.5 >	Sites determined as Contaminated Land >	0	0	0	0	-

100 >	4.6 >	Control of Major Accident Hazards (COMAH) >	0	0	0	0	-
100 >	4.7 >	Regulated explosive sites >	0	0	0	0	-
100 >	4.8 >	Hazardous substance storage/usage >	1	0	0	0	-
101 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	2	0	-
101 >	4.10 >	Licensed industrial activities (Part A(1)) >	3	0	9	1	-
103 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	1	1	-
104 >	4.12 >	Radioactive Substance Authorisations >	0	0	0	0	-
104 >	4.13 >	Licensed Discharges to controlled waters >	0	2	7	6	-
106 >	4.14 >	Pollutant release to surface waters (Red List) >	0	0	0	0	-
106 >	4.15 >	Pollutant release to public sewer >	0	0	0	0	-
106 >	4.16 >	List 1 Dangerous Substances >	0	0	4	1	-
107 >	4.17 >	List 2 Dangerous Substances >	0	0	1	0	-
107 >	4.18 >	Pollution Incidents (EA/NRW) >	1	2	10	3	-
109 >	4.19 >	Pollution inventory substances >	0	0	2	0	-
111 >	4.20 >	Pollution inventory waste transfers >	0	0	1	0	-
115 >	4.21 >	Pollution inventory radioactive waste >	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
116 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
118 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
120 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
121 >	5.4 >	Groundwater vulnerability- soluble rock risk >	Identified (within 0m)				
122 >	5.5 >	Groundwater vulnerability- local information >	Identified (within 0m)				
123 >	5.6 >	Groundwater abstractions >	2	0	5	8	25
133 >	5.7 >	Surface water abstractions >	0	0	0	0	1
133 >	5.8 >	Potable abstractions >	0	0	0	0	4
135 >	5.9 >	Source Protection Zones >	5	4	0	1	-
135 >	5.10 >	Source Protection Zones (confined aquifer) >	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
136 >	6.1 >	Water Network (OS MasterMap) >	0	0	0	-	-

136 >	6.2 >	Surface water features >	0	0	0	-	-
137 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
137 >	6.4 >	WFD Surface water bodies >	0	1	0	-	-
138 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	**River and coastal flooding >**	On site	0-50m	50-250m	250-500m	500-2000m
139 >	7.1 >	Risk of flooding from rivers and the sea >	High (within 50m)				
140 >	7.2 >	Historical Flood Events >	0	0	0	-	-
140 >	7.3 >	Flood Defences >	1	1	0	-	-
140 >	7.4 >	Areas Benefiting from Flood Defences >	1	0	0	-	-
141 >	7.5 >	Flood Storage Areas >	0	0	0	-	-
142 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
143 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	**Surface water flooding >**					
144 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	**Groundwater flooding >**					
146 >	9.1 >	Groundwater flooding >	High (within 50m)				
Page	Section	**Environmental designations >**	On site	0-50m	50-250m	250-500m	500-2000m
147 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	7
148 >	10.2 >	Conserved wetland sites (Ramsar sites) >	0	0	0	0	0
148 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	0
148 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	0	0
149 >	10.5 >	National Nature Reserves (NNR) >	0	0	0	0	0
149 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	0
149 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	0
149 >	10.8 >	Biosphere Reserves >	0	0	0	0	0
150 >	10.9 >	Forest Parks >	0	0	0	0	0
150 >	10.10 >	Marine Conservation Zones >	0	0	0	0	0
150 >	10.11 >	Green Belt >	0	0	0	0	2
150 >	10.12 >	Proposed Ramsar sites >	0	0	0	0	0

151 >	10.13 >	Possible Special Areas of Conservation (pSAC) >	0	0	0	0	0
151 >	10.14 >	Potential Special Protection Areas (pSPA) >	0	0	0	0	0
151 >	10.15 >	Nitrate Sensitive Areas >	0	0	0	0	0
151 >	10.16 >	Nitrate Vulnerable Zones >	0	0	1	0	0
153 >	10.17 >	SSSI Impact Risk Zones >	2	-	-	-	-
155 >	10.18 >	SSSI Units >	0	0	0	0	16
Page	Section	**Visual and cultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
163 >	11.1 >	World Heritage Sites >	0	0	0	-	-
164 >	11.2 >	Area of Outstanding Natural Beauty >	0	0	0	-	-
164 >	11.3 >	National Parks >	0	0	0	-	-
164 >	11.4 >	Listed Buildings >	0	4	7	-	-
165 >	11.5 >	Conservation Areas >	0	1	0	-	-
165 >	11.6 >	Scheduled Ancient Monuments >	0	0	0	-	-
166 >	11.7 >	Registered Parks and Gardens >	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
167 >	12.1 >	Agricultural Land Classification >	Urban (within 250m)				
168 >	12.2 >	Open Access Land >	0	0	0	-	-
168 >	12.3 >	Tree Felling Licences >	0	0	0	-	-
168 >	12.4 >	Environmental Stewardship Schemes >	0	0	0	-	-
168 >	12.5 >	Countryside Stewardship Schemes >	0	0	0	-	-
Page	Section	**Habitat designations >**	On site	0-50m	! 0-250m	250-500m	500-2000m
169 >	13.1 >	Priority Habitat Inventory >	4	2	3	-	-
170 >	13.2 >	Habitat Networks >	0	0	1	-	-
170 >	13.3 >	Open Mosaic Habitat >	0	0	2	-	-
171 >	13.4 >	Limestone Pavement Orders >	0	0	0	-	-
Page	Section	**Geology 1:10,000 scale >**	On site	0-50m	! 0-250m	250-500m	500-2000m
172 >	14.1 >	10k Availability >	Identified (within 500m)				
173 >	14.2 >	Artificial and made ground (10k) >	2	1	2	8	-
175 >	14.3 >	Superficial geology (10k) >	1	1	0	4	-

176 >	14.4 >	Landslip (10k) >	0	0	0	0	-
177 >	14.5 >	Bedrock geology (10k) >	1	0	3	1	-
178 >	14.6 >	Bedrock faults and other linear features (10k) >	0	0	0	0	-
Page	Section	**Geology 1:50,000 scale >**	On site	0-50m	50-250m	250-500m	500-2000m
179 >	15.1 >	50k Availability >	Identified (within 500m)				
180 >	15.2 >	Artificial and made ground (50k) >	2	1	2	8	-
181 >	15.3 >	Artificial ground permeability (50k) >	1	0	-	-	-
182 >	15.4 >	Superficial geology (50k) >	1	1	0	3	-
183 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
183 >	15.6 >	Landslip (50k) >	0	0	0	0	-
183 >	15.7 >	Landslip permeability (50k) >	None (within 50m)				
184 >	15.8 >	Bedrock geology (50k) >	1	0	3	0	-
185 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
185 >	15.10 >	Bedrock faults and other linear features (50k) >	0	0	0	0	-
Page	Section	**Boreholes >**	On site	0-50m	50-250m	250-500m	500-2000m
186 >	16.1 >	BGS Boreholes >	4	5	28	-	-
Page	Section	**Natural ground subsidence >**					
189 >	17.1 >	Shrink swell clays >	Low (within 50m)				
190 >	17.2 >	Running sands >	Moderate (within 50m)				
192 >	17.3 >	Compressible deposits >	High (within 50m)				
194 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
195 >	17.5 >	Landslides >	Very low (within 50m)				
197 >	17.6 >	Ground dissolution of soluble rocks >	Low (within 50m)				
Page	Section	**Mining, ground workings and natural cavities >**	On site	0-50m	50-250m	250-500m	500-2000m
199 >	18.1 >	Natural cavities >	0	0	1	4	-
200 >	18.2 >	BritPits >	1	0	2	7	-
202 >	18.3 >	Surface ground workings >	58	28	131	-	-
210 >	18.4 >	Underground workings >	0	4	1	13	7
211 >	18.5 >	Historical Mineral Planning Areas >	0	1	1	3	-

212 >	18.6 >	Non-coal mining >	1	0	1	0	0
212 >	18.7 >	Mining cavities >	1	1	1	1	0
213 >	18.8 >	JPB mining areas >	None (within 0m)				
213 >	18.9 >	Coal mining >	None (within 0m)				
213 >	18.10 >	Brine areas >	None (within 0m)				
213 >	18.11 >	Gypsum areas >	None (within 0m)				
214 >	18.12 >	Tin mining >	None (within 0m)				
214 >	18.13 >	Clay mining >	None (within 0m)				

Page	Section	Radon >					
215 >	19.1 >	Radon >	Less than 1% (within 0m)				

Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
217 >	20.1 >	BGS Estimated Background Soil Chemistry >	4	1	-	-	-
217 >	20.2 >	BGS Estimated Urban Soil Chemistry >	0	0	-	-	-
218 >	20.3 >	BGS Measured Urban Soil Chemistry >	0	0	-	-	-

Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
219 >	21.1 >	Underground railways (London) >	0	0	0	-	-
219 >	21.2 >	Underground railways (Non-London) >	0	0	0	-	-
220 >	21.3 >	Railway tunnels >	0	1	0	-	-
220 >	21.4 >	Historical railway and tunnel features >	30	32	70	-	-
225 >	21.5 >	Royal Mail tunnels >	0	0	0	-	-
225 >	21.6 >	Historical railways >	0	0	3	-	-
226 >	21.7 >	Railways >	0	5	6	-	-
226 >	21.8 >	Crossrail 1 >	0	0	0	0	-
226 >	21.9 >	Crossrail 2 >	0	0	0	0	-
227 >	21.10 >	HS2 >	0	0	0	0	-

Recent aerial photograph

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Capture Date: 31/05/2021

Site Area: 10.14ha

Recent site history - 2018 aerial photograph

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Capture Date: 01/09/2018

Site Area: 10.14ha

Recent site history - 2014 aerial photograph

Capture Date: 31/07/2014

Site Area: 10.14ha

Recent site history - 2009 aerial photograph

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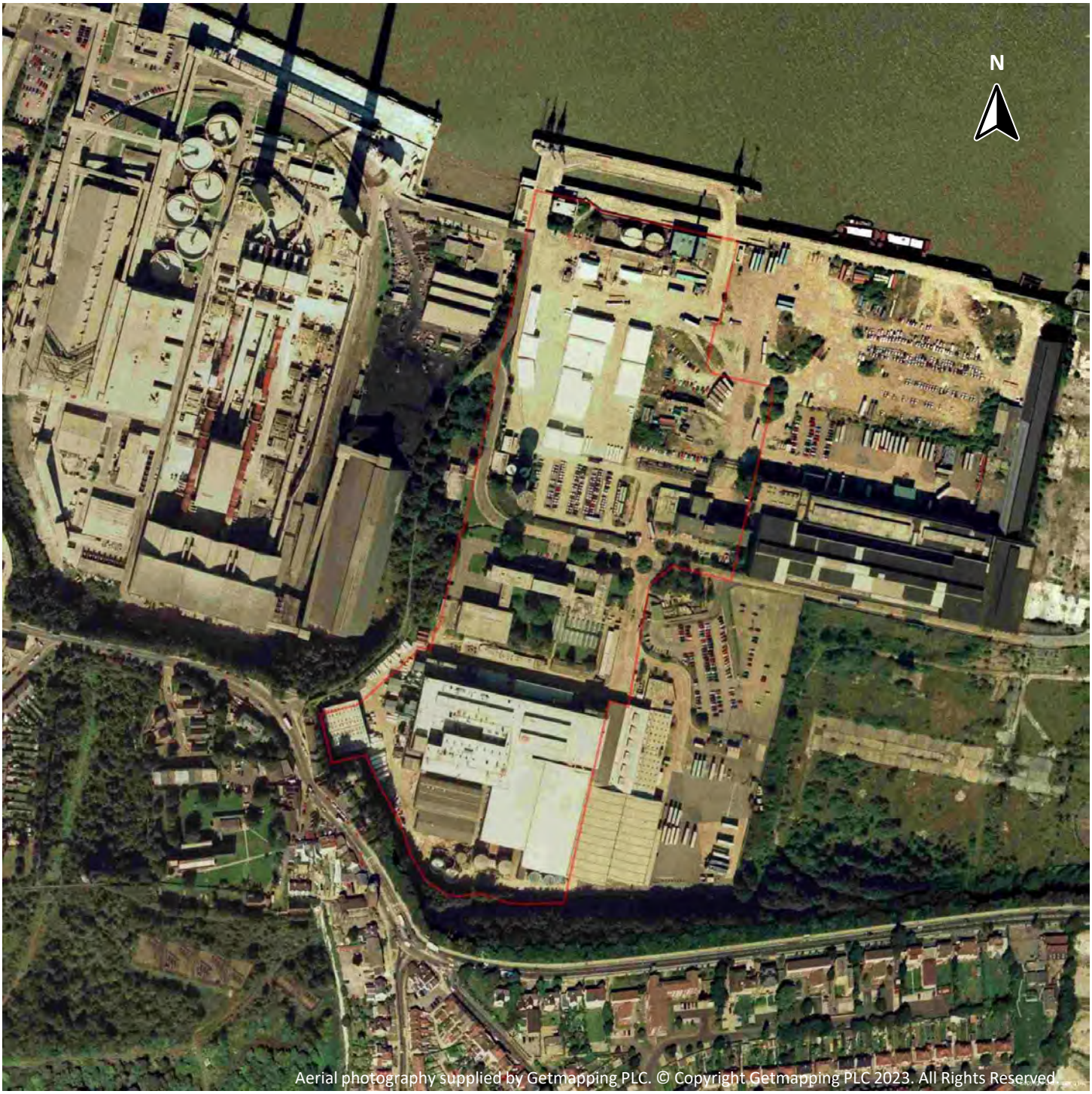
Capture Date: 27/09/2009

Site Area: 10.14ha

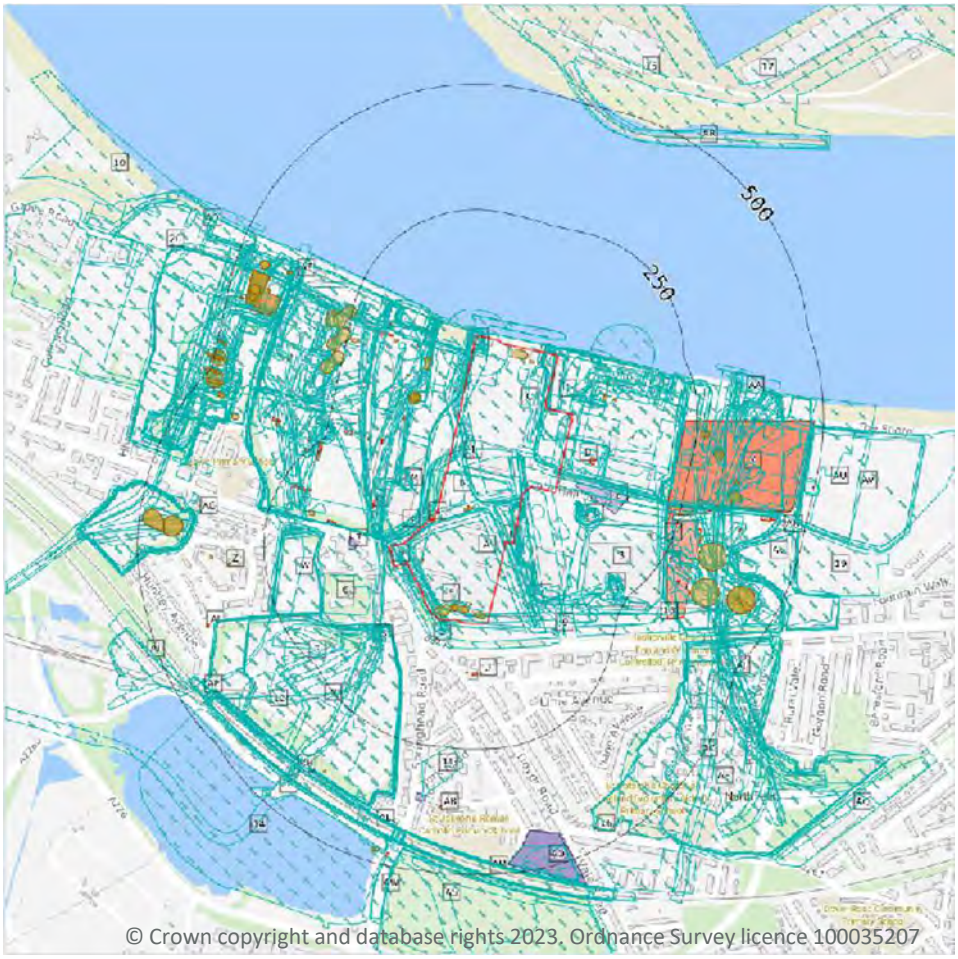
Recent site history - 1999 aerial photograph



Capture Date: 03/09/1999

Site Area: 10.14ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	641

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13 >**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Unspecified Tank**	**1966 - 1990**	**2253261**

ID	Location	Land use	Dates present	Group ID
2	On site	Tramway Sidings	1938	2259493
3	On site	Disused Cement Works	1938 - 1946	2263565
A	On site	Unspecified Commercial/Industrial	1966	2131133
A	On site	Paper Mill	1990	2163242
A	On site	Brick Works	1895	2173447
A	On site	Brick Works	1888 - 1923	2178411
A	On site	Unspecified Mills	1971 - 1977	2206547
B	On site	Unspecified Ground Workings	1946	2134370
B	On site	Unspecified Heap	1955	2137192
B	On site	Unspecified Tank	1888	2155360
B	On site	Railway Sidings	1888	2180279
B	On site	Railway Sidings	1898	2193616
B	On site	Railway Sidings	1895	2202854
B	On site	Railway Sidings	1907	2212158
B	On site	Railway Sidings	1865	2219488
B	On site	Brick Works	1923	2265241
B	On site	Tramway Sidings	1916	2272871
B	On site	Railway Sidings	1898	2279934
B	On site	Railway Sidings	1895	2284631
C	On site	Unspecified Ground Workings	1955	2134371
C	On site	Dock Yard	1865	2135653
C	On site	Unspecified Warehouse	1990	2138636
C	On site	Unspecified Mills	1955	2139422
C	On site	Unspecified Foundry	1895	2140137
C	On site	Unspecified Factory	1865	2151044
C	On site	Disused Dock	1923	2164754
C	On site	Disused Dockyard	1895	2175883
C	On site	Disused Dockyard	1888	2176821

ID	Location	Land use	Dates present	Group ID
C	On site	Old Dock	1888	2182299
C	On site	Tramway Sidings	1932	2183788
C	On site	Paper Mill	1946	2187262
C	On site	Disused Dockyard	1916	2188060
C	On site	Old Dock	1895	2202877
C	On site	Disused Dockyard	1895	2206513
C	On site	Unspecified Tanks	1966 - 1990	2218498
C	On site	Old Dock	1907	2236667
C	On site	Unspecified Foundry	1898	2238796
C	On site	Railway Sidings	1971	2256057
C	On site	Old Dock	1916 - 1923	2257119
C	On site	Paper Mill	1932 - 1938	2260367
C	On site	Unspecified Mill	1966 - 1977	2273577
C	On site	Railway Sidings	1977	2275768
C	On site	Old Dock	1895 - 1898	2276300
C	On site	Disused Dockyard	1898	2288867
C	On site	Disused Dockyard	1907	2290228
C	On site	Tramway Sidings	1946	2295288
D	On site	Unspecified Heap	1916	2137179
D	On site	Mineral Railway Sidings	1955 - 1966	2240800
E	On site	Unspecified Heap	1865	2137193
E	On site	Unspecified Ground Workings	1888	2195293
E	On site	Unspecified Ground Workings	1898	2202804
E	On site	Unspecified Heap	1938	2237069
E	On site	Unspecified Heap	1895	2250110
E	On site	Unspecified Heap	1955	2284324
E	On site	Unspecified Heap	1938	2291476
E	On site	Unspecified Ground Workings	1946	2292333

ID	Location	Land use	Dates present	Group ID
F	**On site**	**Unspecified Heap**	**1865**	**2137194**
F	**On site**	**Unspecified Tank**	**1966**	**2155361**
F	**On site**	**Rifle Range**	**1865**	**2164820**
F	**On site**	**Unspecified Tanks**	**1990**	**2218516**
F	**On site**	**Unspecified Tanks**	**1971 - 1977**	**2236011**
G	**On site**	**Railway Sidings**	**1938**	**2182970**
G	**On site**	**Unspecified Wharves**	**1898**	**2194823**
G	**On site**	**Unspecified Wharf**	**1955 - 1966**	**2203811**
G	**On site**	**Unspecified Wharves**	**1888**	**2225973**
G	**On site**	**Railway Sidings**	**1938**	**2235239**
G	**On site**	**Unspecified Foundry**	**1888 - 1895**	**2257006**
G	**On site**	**Unspecified Wharf**	**1865**	**2261188**
G	**On site**	**Cement Works**	**1938**	**2264284**
G	**On site**	**Unspecified Wharves**	**1938**	**2267097**
G	**On site**	**Tramway Sidings**	**1923**	**2289529**
H	**On site**	**Unspecified Pit**	**1955 - 1977**	**2200393**
H	**On site**	**Smithy**	**1888**	**2262861**
H	**On site**	**Smithy**	**1898**	**2265865**
I	**On site**	**Unspecified Ground Workings**	**1932**	**2202051**
I	**On site**	**Railway Sidings**	**1865**	**2254252**
J	**On site**	**Unspecified Ground Workings**	**1938**	**2230096**
J	**On site**	**Unspecified Ground Workings**	**1916**	**2271894**
J	**On site**	**Unspecified Ground Workings**	**1938**	**2277015**
C	1m NE	Cuttings	1865	2129957
G	2m N	Unspecified Works	1971	2224509
G	2m N	Unspecified Works	1990	2245584
G	2m N	Unspecified Works	1977	2249897
C	3m NE	Unspecified Wharf	1955	2258935

ID	Location	Land use	Dates present	Group ID
G	3m N	Portland Cement Works	1938	2142882
G	3m N	Cement Works	1916	2201048
G	8m N	Unspecified Wharves	1907	2235374
H	8m SW	Smithy	1895	2167463
G	11m N	Unspecified Wharves	1946	2203805
H	12m SW	Smithy	1895	2167464
G	12m N	Unspecified Tank	1865	2155385
G	12m N	Unspecified Wharves	1932	2230920
G	13m SW	Railway Sidings	1971	2198214
H	13m SW	Tunnel	1971	2204151
H	13m SW	Tunnel	1990	2206369
G	13m SW	Railway Sidings	1990	2189766
G	14m N	Cement Works	1895	2199577
G	14m N	Cement Works	1907	2212428
E	16m SE	Lime Kilns	1865	2137927
G	21m SW	Unspecified Commercial/Industrial	1932 - 1938	2189289
K	21m SW	Tunnels	1865	2164893
G	22m N	Cement Works	1888 - 1898	2199361
G	22m SW	Tramway Sidings	1932	2172445
K	22m SW	Tunnels	1865	2164895
G	23m SW	Railway Sidings	1907	2233255
G	23m SW	Railway Sidings	1895	2273890
E	23m SE	Unspecified Heap	1865	2137191
G	24m SW	Unspecified Works	1990	2226028
G	24m SW	Unspecified Works	1977	2276056
G	26m N	Unspecified Wharves	1923	2140515
C	26m NE	Chimney	1971	2238457
C	27m NE	Unspecified Ground Workings	1907	2227237

ID	Location	Land use	Dates present	Group ID
C	27m NE	Unspecified Ground Workings	1895	2274503
C	28m NE	Unspecified Ground Workings	1888	2201011
G	30m SW	Tramway Sidings	1923	2200679
G	30m SW	Cement Works	1923	2222770
G	31m SW	Cement Works	1888	2207749
G	31m SW	Railway Sidings	1888	2211643
C	31m NE	Unspecified Ground Workings	1898	2273898
C	32m NE	Unspecified Ground Workings	1895	2244711
G	33m SW	Tramway Sidings	1946	2217156
C	36m NE	Unspecified Ground Workings	1916	2186884
G	36m SW	Railway Sidings	1898	2232282
G	38m SW	Tramway Sidings	1916	2281823
D	40m E	Unspecified Tank	1946	2155352
L	42m E	Unspecified Heap	1938	2190527
L	44m E	Unspecified Ground Workings	1938	2243098
L	44m E	Unspecified Heap	1932 - 1938	2247467
L	45m E	Unspecified Heap	1907	2171451
L	45m E	Unspecified Ground Workings	1946	2218651
L	45m E	Unspecified Heap	1895	2284571
L	47m E	Unspecified Ground Workings	1916	2226673
G	47m SW	Railway Sidings	1895	2182495
L	49m SE	Unspecified Heap	1865	2137190
L	49m E	Unspecified Ground Workings	1898	2255009
L	50m E	Unspecified Heap	1955	2228430
M	51m W	Unspecified Heap	1888	2290781
L	51m E	Unspecified Ground Workings	1888 - 1895	2279092
L	51m E	Unspecified Ground Workings	1865	2181299
L	55m E	Unspecified Heap	1923	2278695

ID	Location	Land use	Dates present	Group ID
M	57m W	Unspecified Heap	1895 - 1907	2191624
M	60m W	Unspecified Heap	1938	2242810
M	61m W	Unspecified Heap	1916	2261428
M	61m W	Unspecified Heap	1932	2214003
M	61m W	Unspecified Heap	1946	2264641
M	61m W	Unspecified Heap	1938	2247659
8	62m E	Railway Sidings	1971	2196674
N	62m E	Unspecified Works	1971 - 1977	2282059
G	63m W	Railway Sidings	1977	2247460
M	64m W	Unspecified Heap	1895	2251794
I	64m S	Unspecified Heap	1955	2257578
I	64m S	Unspecified Heap	1946	2256100
O	65m SW	Grave Yard	1865	2145773
C	67m NE	Unspecified Wharf	1966 - 1990	2269518
I	67m S	Unspecified Heap	1938	2238615
I	69m S	Unspecified Heap	1938	2258960
I	74m S	Unspecified Heap	1888	2194788
G	75m N	Unspecified Wharves	1888	2257888
G	75m N	Unspecified Wharves	1895	2256295
G	79m N	Unspecified Wharves	1898	2269488
G	80m N	Unspecified Wharf	1955	2251318
G	81m NW	Unspecified Tank	1932	2231785
G	81m NW	Unspecified Tank	1907	2243257
P	82m SW	Chalk Pit	1938	2201799
P	83m SW	Unspecified Disused Pit	1977 - 1990	2185472
P	83m SW	Burial Ground	1977	2242377
G	83m N	Wharves	1916	2143216
G	83m NW	Railway Sidings	1938	2262245

ID	Location	Land use	Dates present	Group ID
G	83m N	Railway Sidings	1938	2216955
G	83m N	Unspecified Wharves	1938	2224983
P	83m SW	Chalk Pit	1916	2206811
G	84m NW	Unspecified Tank	1946	2226120
G	84m NW	Unspecified Tank	1938	2178127
P	84m SW	Chalk Pit	1895 - 1898	2264989
G	85m NW	Unspecified Tank	1955	2222567
P	85m SW	Chalk Pit	1907	2228865
P	85m SW	Tramway Sidings	1907	2269038
P	86m SW	Chalk Pit	1938	2226835
P	86m SW	Old Chalk Pit	1938 - 1946	2169483
P	86m SW	Burial Ground	1955 - 1966	2214742
P	87m SW	Chalk Pit	1923	2255946
C	88m E	Unspecified Pit	1865	2126206
R	89m SW	Tramway Sidings	1923 - 1946	2210284
C	90m NE	Chimney	1966	2261280
N	92m SE	Unspecified Works	1990	2202868
P	92m SW	Chalk Pit	1895	2265909
P	93m SW	Old Chalk Pit	1932	2195684
S	95m SW	Railway Sidings	1895	2234406
T	95m SW	Tramway Sidings	1938	2193577
P	99m SW	Chalk Pit	1888	2260049
S	99m SW	Railway Sidings	1888	2229381
V	101m SE	Unspecified Heap	1955	2203412
G	102m W	Mineral Railway Sidings	1966	2164032
S	102m SW	Railway Sidings	1898	2196400
S	102m SW	Railway Sidings	1898	2239648
P	105m SW	Tramway Sidings	1916	2216135

ID	Location	Land use	Dates present	Group ID
G	108m NW	Unspecified Wharves	1888	2228901
P	111m SW	Mineral Railway Sidings	1966	2164033
C	118m E	Unspecified Pit	1865	2126205
G	120m NW	Unspecified Ground Workings	1955 - 1966	2193520
G	122m NW	Unspecified Ground Workings	1932	2214691
G	123m NW	Unspecified Heap	1938	2281542
G	126m NW	Unspecified Wharves	1938	2188799
9	128m SE	Unspecified Heap	1946 - 1955	2226084
W	132m W	Old Chalk Pit	1888 - 1895	2201073
W	132m W	Old Chalk Pit	1895	2194464
G	133m NW	Unspecified Ground Workings	1938	2251848
V	133m SE	Unspecified Ground Workings	1888 - 1895	2240550
G	133m NW	Unspecified Tank	1971	2155384
G	133m NW	Chimney	1977 - 1990	2214577
W	135m W	Unspecified Disused Pit	1977 - 1990	2214208
W	135m W	Old Chalk Pit	1898	2174323
W	137m W	Unspecified Pit	1923	2275681
W	138m W	Unspecified Pit	1955 - 1966	2175080
G	145m W	Unspecified Ground Workings	1865	2134372
G	148m W	Unspecified Pit	1955 - 1966	2248034
G	155m NW	Unspecified Wharves	1898	2173374
G	159m W	Railway Sidings	1895	2221164
G	159m NW	Unspecified Wharves	1932	2233409
G	159m W	Unspecified Commercial/Industrial	1946	2177592
V	161m SE	Unspecified Ground Workings	1932	2224506
G	163m W	Railway Sidings	1888	2212090
G	164m NW	Unspecified Wharf	1865	2288737
G	164m NW	Tramway Sidings	1865	2229224

ID	Location	Land use	Dates present	Group ID
G	170m W	Railway Sidings	1898	2231608
G	170m W	Railway Sidings	1898	2232469
G	179m W	Unspecified Heaps	1955 - 1966	2268760
G	182m W	Tunnel	1971	2151567
G	183m W	Cement Works	1938	2260164
G	184m NW	Unspecified Wharves	1946	2213252
10	189m NW	Unspecified Wharf	1895	2270164
G	190m NW	Tramway Sidings	1865	2178519
G	193m W	Railway Sidings	1888	2190216
G	194m NW	Unspecified Works	1955 - 1966	2196647
G	196m W	Brick Works	1895	2213430
V	197m SE	Unspecified Pit	1865	2126202
G	198m W	Railway Sidings	1895 - 1898	2200731
G	199m NW	Brick Works	1895	2211016
G	199m NW	Cement Works	1907	2271974
V	199m SE	Unspecified Heap	1923 - 1938	2200919
V	199m SE	Unspecified Heap	1938	2262977
X	201m E	Cement Works	1916	2172745
V	203m SE	Unspecified Ground Workings	1898	2236289
V	203m SE	Unspecified Ground Workings	1898	2265691
V	203m SE	Unspecified Heap	1895	2274163
V	203m SE	Unspecified Heap	1946	2284826
X	204m E	Cement Works	1907	2178945
V	206m SE	Unspecified Heap	1907	2277284
G	207m NW	Unspecified Tank	1971	2155386
G	207m NW	Chimney	1977 - 1990	2276814
G	207m W	Unspecified Ground Workings	1865	2134373
X	208m E	Cement Works	1923	2261569

ID	Location	Land use	Dates present	Group ID
G	211m W	Unspecified Pit	1895	2126199
N	213m E	White Lead Works	1895	2178157
G	217m W	Gravel Pit	1966	2139095
G	217m W	Refuse Heap	1955	2213837
X	218m E	Power Station	1977 - 1990	2196236
N	220m E	Whiting Works	1916	2239701
N	220m E	Whiting Works	1938	2183039
N	220m E	Whiting Works	1938	2217810
X	220m E	Unspecified Works	1966 - 1971	2289828
N	221m E	Disused Cement Works	1932	2171407
G	222m NW	Gas Works	1895	2135574
N	223m E	Lead Works	1898	2173024
N	223m E	Railway Sidings	1865	2180092
N	226m E	Unspecified Commercial/Industrial	1907 - 1916	2241032
N	226m E	White Lead Works	1888 - 1895	2284295
G	227m NW	Unspecified Wharves	1932 - 1938	2256480
X	227m E	Railway Sidings	1907	2278942
Y	228m E	Lime Kilns	1865	2137925
G	229m NW	Railway Sidings	1938	2231939
G	229m NW	Railway Sidings	1938	2293485
G	229m NW	Railway Sidings	1916	2253026
G	234m W	Unspecified Heap	1895 - 1907	2225807
N	234m E	Railway Sidings	1916	2207145
G	236m W	Unspecified Ground Workings and Heap	1888	2138421
N	236m E	Whiting Works	1907 - 1923	2182525
G	237m W	Unspecified Heap	1916	2224608
G	238m NW	Unspecified Tanks	1971 - 1990	2203595
G	239m W	Unspecified Heap	1938 - 1946	2198347

ID	Location	Land use	Dates present	Group ID
G	240m W	Unspecified Heap	1938	2177199
G	240m W	Refuse Heap	1907	2283287
G	242m W	Unspecified Heap	1946	2260825
G	242m W	Unspecified Ground Workings	1932	2260766
G	243m W	Unspecified Ground Workings	1938	2283864
G	245m W	Unspecified Heap	1895	2284148
11	245m S	Barrack Field	1865	2162777
G	246m W	Refuse Heap	1895	2266317
G	249m W	Refuse Heap	1898	2185867
X	249m E	Cement Works	1923	2276410
G	251m NW	Unspecified Ground Workings	1865 - 1895	2278654
G	252m NW	Unspecified Ground Workings	1888	2289276
G	252m NW	Unspecified Heap	1895	2231545
G	255m W	Unspecified Heap	1865	2137189
G	256m NW	Unspecified Ground Workings	1898	2260961
G	258m W	Unspecified Heap	1955 - 1966	2273343
N	258m E	Unspecified Ground Workings	1932	2290262
G	258m NW	Unspecified Heap	1923	2285804
N	260m E	Unspecified Pit	1946	2126201
G	260m NW	Unspecified Heaps	1907	2160807
G	262m NW	Railway Sidings	1888	2287501
N	262m E	Unspecified Ground Workings	1938	2271529
G	262m NW	Unspecified Ground Workings	1916	2187722
G	266m NW	Unspecified Tanks	1888 - 1898	2270541
G	266m NW	Railway Sidings	1898	2182140
G	266m NW	Railway Sidings	1898	2203069
G	267m NW	Railway Sidings	1955	2208314
G	268m NW	Unspecified Tanks	1923	2269182

ID	Location	Land use	Dates present	Group ID
G	270m NW	Unspecified Tanks	1907	2193341
N	272m E	Railway Sidings	1895	2268619
G	274m NW	Unspecified Heap	1938 - 1946	2244889
G	274m NW	Railway Sidings	1966	2239807
G	274m NW	Tanks	1916	2162274
G	275m NW	Unspecified Heap	1932	2247677
G	276m NW	Unspecified Ground Workings	1946	2248616
G	277m NW	Unspecified Heap	1955 - 1966	2219062
X	278m E	Railway Sidings	1895	2178142
N	280m SE	Tramway Sidings	1932	2270302
N	282m E	Railway Sidings	1898	2249046
X	284m E	Disused Cement Works	1938	2258554
N	286m E	Railway Sidings	1888	2230386
X	289m E	Unspecified Tank	1946	2272305
X	290m E	Tank	1916	2140334
N	290m E	Tramway Sidings	1923	2209466
X	294m E	Unspecified Tank	1923 - 1932	2223889
X	294m E	Unspecified Tank	1907	2264045
X	295m E	Unspecified Works	1966 - 1971	2223965
X	296m E	Unspecified Tank	1938	2243937
G	296m W	Unspecified Heaps	1865	2160806
R	305m SW	Cuttings	1955 - 1966	2250541
X	305m E	Disused Cement Works	1932	2174372
X	306m E	Disused Cement Works	1946	2248542
12	306m SW	Burial Ground	1971 - 1977	2276672
G	307m NW	Unspecified Pit	1916 - 1923	2287279
G	308m NW	Unspecified Pit	1907	2266377
13	310m SE	Unspecified Heap	1955	2137198

ID	Location	Land use	Dates present	Group ID
N	310m E	Unspecified Tanks	1977	2186359
N	310m E	Unspecified Tanks	1990	2220603
N	315m E	Whiting Works	1895	2224774
AA	321m E	Unspecified Wharf	1895	2189541
AA	322m E	Unspecified Wharves	1938	2267802
AA	323m E	Unspecified Wharf	1946	2184902
AA	323m E	Unspecified Wharf	1895 - 1898	2197099
AA	326m E	Unspecified Wharf	1888	2188208
AA	331m E	Railway Building	1895	2150385
X	337m E	Tank	1916	2140336
X	338m E	Unspecified Tank	1946	2192348
X	338m E	Unspecified Tanks	1932 - 1938	2207974
X	338m E	Unspecified Tank	1938	2198996
X	339m E	Unspecified Pit	1895	2196465
X	341m E	Unspecified Pit	1865	2246996
X	342m E	Unspecified Tank	1955	2257393
X	343m E	Unspecified Tank	1907	2216981
X	343m E	Unspecified Tank	1932	2268628
AA	344m E	Railway Sidings	1865	2277546
X	344m E	Unspecified Tank	1923	2263596
X	345m E	Unspecified Pit	1898	2291256
N	347m E	Whiting Works	1898	2253968
N	349m E	Railway Sidings	1938	2292502
G	349m W	Unspecified Heap	1932	2280363
X	349m E	Unspecified Pit	1888 - 1895	2193764
N	350m E	Whiting Works	1888	2208554
G	350m W	Unspecified Heap	1938	2258662
G	352m W	Unspecified Ground Workings	1916	2253710

ID	Location	Land use	Dates present	Group ID
AA	356m E	Chimney	1966 - 1990	2253934
G	368m NW	Railway Sidings	1938	2194554
AD	368m NW	Unspecified Works	1977 - 1990	2267204
AA	368m E	Unspecified Wharf	1932	2239534
AE	368m NW	Unspecified Wharf	1895	2174813
AE	369m NW	Unspecified Wharf	1946	2227580
AE	369m NW	Unspecified Wharf	1932	2267120
N	369m E	Tank	1916	2140335
AA	369m E	Quay	1865	2139307
AF	370m SE	Chalk Pit	1938	2286029
AG	371m E	Old Chalk Pit	1895	2250767
G	373m NW	Refuse Heap	1938	2281695
G	374m NW	Refuse Heap	1946	2290801
N	374m E	Unspecified Tank	1907	2155355
AG	378m E	Unspecified Works	1955	2270972
AE	379m W	Cement Works	1938	2245417
AA	380m E	Unspecified Wharf	1895	2282260
AE	380m NW	Unspecified Wharf	1865 - 1888	2250458
AG	380m E	Unspecified Ground Workings	1907	2280390
AG	380m E	Old Chalk Pit	1895	2287516
AE	381m NW	Unspecified Wharf	1895	2182716
AC	381m W	Unspecified Tank	1938	2155300
AE	381m W	Cement Works	1907 - 1916	2198904
AG	382m E	Old Chalk Pit	1898	2234948
AE	382m W	Unspecified Pit	1865	2126200
AG	382m E	Chalk Pit	1888	2157766
AH	383m SW	Tunnel	1977 - 1990	2218238
AC	384m W	Tramway Sidings	1888 - 1898	2189056

ID	Location	Land use	Dates present	Group ID
AC	384m W	Unspecified Quarry	1888	2270926
AE	385m NW	Gas Works	1895 - 1923	2197699
AE	386m NW	Cement Works	1923	2227374
AE	386m NW	Unspecified Wharf	1898	2227582
AE	386m NW	Unspecified Tank	1966	2205104
AC	387m W	Quarry	1916	2143070
AF	387m SE	Old Chalk Pit	1932	2272466
AE	387m NW	Unspecified Tank	1946	2264603
AH	387m SW	Tunnel	1938 - 1946	2259364
AE	388m NW	Unspecified Tank	1932	2269509
AJ	388m SE	Old Chalk Pit	1895	2291323
AF	388m SE	Unspecified Pit	1955 - 1966	2254534
AF	389m SE	Old Chalk Pit	1938 - 1946	2274267
AK	389m SE	Disused Workings	1990	2144633
AK	389m SE	Unspecified Pit	1971 - 1990	2241389
AH	389m SW	Tunnel	1932	2237676
AC	389m W	Unspecified Quarry	1938	2212291
AC	390m W	Unspecified Quarry	1895 - 1907	2290194
AC	390m W	Unspecified Quarry	1923	2222565
AE	390m NW	Portland Cement Works	1938	2142881
AE	391m NW	Unspecified Commercial/Industrial	1990	2131137
AE	391m NW	Unspecified Works	1971 - 1977	2285621
AC	391m W	Unspecified Old Quarry	1932	2204295
AC	391m W	Unspecified Old Quarry	1946	2240083
AC	391m W	Railway Sidings	1895 - 1907	2272832
AC	392m W	Unspecified Quarry	1990	2180631
AC	392m W	Unspecified Old Quarry	1938	2219695
AE	392m NW	Cement Works	1895	2190489

ID	Location	Land use	Dates present	Group ID
AE	392m NW	Railway Sidings	1895	2201192
AE	392m NW	Cement Works	1938	2255887
AC	393m W	Tramway Sidings	1923	2270090
AE	393m NW	Cement Works	1932	2259850
AC	393m W	Unspecified Tank	1946	2155299
AE	394m W	Unspecified Tank	1971 - 1990	2178010
AE	394m NW	Cement Works	1946	2269578
AJ	394m SE	Unspecified Works	1977 - 1990	2227273
AC	394m W	Unspecified Ground Workings	1955	2134375
AC	394m W	Unspecified Pit	1966	2234234
AC	394m W	Unspecified Quarry	1938	2230336
AE	395m NW	Brick Works	1898	2267552
AE	396m NW	Railway Sidings	1888	2206474
AC	396m W	Unspecified Tank	1932	2155298
AJ	396m SE	Old Chalk Pit	1888 - 1898	2283604
AF	396m SE	Chalk Pit	1916	2291806
N	397m E	Unspecified Pit	1971	2126194
AH	399m SW	Cuttings	1907	2192325
AH	399m SW	Cuttings	1895	2238165
AE	399m NW	Tramway Sidings	1946	2244792
AE	400m NW	Railway Sidings	1898	2284790
AE	400m NW	Tramway Sidings	1923	2280216
AL	400m SW	Cuttings	1938	2237041
AH	401m SW	Cuttings	1938	2251327
AC	401m W	Unspecified Quarry	1895	2222667
AH	401m SW	Cuttings	1895	2271612
AE	401m W	Brick Works	1888	2266509
T	402m SW	Cuttings	1946	2170626

ID	Location	Land use	Dates present	Group ID
AE	402m NW	Railway Sidings	1907	2256771
AF	402m SE	Chalk Pit	1907	2182199
AL	402m S	Cuttings	1932	2264051
AE	403m W	Railway Sidings	1916	2223194
AE	403m NW	Railway Sidings	1895	2170939
AE	403m NW	Gas Works	1895	2280294
AE	404m W	Unspecified Pit	1895	2173101
T	404m SW	Cuttings	1932	2248862
AF	404m SE	Chalk Pit	1923	2231607
T	404m SW	Cuttings	1938	2248116
AH	405m SW	Cuttings	1865	2186329
AE	405m NW	Railway Sidings	1938	2185989
AH	405m SW	Cuttings	1923	2179093
N	405m SE	Lime Kiln	1865	2166925
AA	405m E	Chimney	1966 - 1990	2172660
N	406m SE	Unspecified Tank	1895	2155359
AE	407m W	Unspecified Ground Workings	1938	2200630
AM	408m S	Cuttings	1938	2212837
AA	408m E	Unspecified Wharf	1946	2250583
AE	409m W	Unspecified Pit	1923	2295096
AE	409m W	Unspecified Ground Workings	1946	2195957
AC	409m W	Unspecified Tanks	1990	2288161
AE	410m W	Unspecified Ground Workings	1938	2293261
AL	411m S	Cuttings	1971 - 1990	2250911
AL	411m S	Cuttings	1955	2274099
AM	411m S	Cuttings	1966	2256839
AE	411m W	Unspecified Ground Workings	1907	2187583
AE	411m W	Unspecified Ground Workings	1932	2227340

ID	Location	Land use	Dates present	Group ID
AD	411m NW	Unspecified Wharf	1946	2174998
AE	412m W	Clay Mill	1865	2166682
AE	413m W	Unspecified Ground Workings	1916	2245674
AC	413m W	Unspecified Tanks	1971 - 1977	2221777
N	413m SE	Unspecified Tanks	1932	2277635
AE	413m NW	Unspecified Wharf	1938	2269449
AE	413m NW	Unspecified Wharf	1938	2284946
N	415m SE	Unspecified Tanks	1938	2198991
AJ	415m SE	Tunnel	1938	2186953
AJ	416m SE	Tunnel	1916 - 1923	2214375
AE	418m W	Unspecified Pit	1971 - 1990	2244611
AE	418m NW	Gas Works	1888	2275082
AE	418m W	Unspecified Pit	1865	2126197
AJ	420m SE	Tunnel	1938 - 1946	2222826
AJ	421m SE	Tunnel	1932	2201075
N	421m SE	Unspecified Tank	1895	2155358
AM	423m S	Cuttings	1895	2225362
AM	426m S	Cuttings	1916	2238478
AM	427m S	Cuttings	1898	2256878
AM	427m S	Cuttings	1898	2287436
AE	427m W	Unspecified Works	1955	2181006
AE	427m W	Cement Works	1966	2191753
AE	427m W	Unspecified Pit	1955	2220863
AM	427m S	Cuttings	1865 - 1888	2173593
AE	428m NW	Gas Works	1865	2196446
AM	428m S	Cuttings	1907 - 1946	2182780
AM	428m S	Cuttings	1895	2265791
AM	428m S	Cuttings	1923 - 1990	2177141

ID	Location	Land use	Dates present	Group ID
AE	428m W	Unspecified Ground Workings	1907	2201701
AE	429m NW	Unspecified Pit	1955	2126198
AE	429m W	Brick Field	1865	2146742
AJ	429m SE	Tunnel	1907	2221121
AK	430m SE	Unspecified Workings	1977	2151480
AE	430m NW	Gasometers	1888	2219354
AE	431m NW	Gasometer	1865 - 1895	2251285
AE	431m NW	Gasometer	1907	2267711
AA	431m E	Unspecified Wharf	1932	2240138
14	432m SW	Chalk Pit	1932 - 1938	2221295
AJ	432m SE	Unspecified Quarry	1865	2145147
AE	433m NW	Unspecified Tank	1966 - 1971	2245813
AE	435m NW	Gasometers	1898	2246274
AE	436m NW	Gasometer	1923	2198636
AE	436m NW	Unspecified Tank	1895	2178668
AE	436m NW	Unspecified Tank	1907	2189915
AE	436m NW	Unspecified Tanks	1932	2295240
AN	437m E	Engineering Works	1946	2142111
AP	437m SW	Cuttings	1888	2238616
AJ	437m SE	Railway Sidings	1895	2236870
AE	437m NW	Unspecified Tanks	1946	2289538
AP	438m SW	Cuttings	1895	2275660
AP	439m SW	Cuttings	1946	2188749
AE	439m W	Unspecified Tank	1888	2221871
AE	440m W	Unspecified Tank	1932	2173552
AE	440m W	Unspecified Tank	1907	2223911
AE	440m W	Unspecified Tank	1895	2281766
AE	440m W	Unspecified Tank	1923	2236118

ID	Location	Land use	Dates present	Group ID
AP	440m SW	Cuttings	1932	2193908
AQ	440m SE	Tramway Sidings	1946	2204626
AE	441m NW	Gasometers	1916	2201676
AJ	441m SE	Railway Sidings	1865	2170158
AE	441m NW	Unspecified Tank	1923	2249129
AE	441m W	Unspecified Ground Workings	1865	2231370
AE	441m NW	Gasometer	1895	2210501
AP	444m SW	Cuttings	1895	2268145
AE	444m W	Unspecified Tank	1898	2182614
AE	444m W	Unspecified Tank	1938 - 1946	2206358
AC	445m W	Unspecified Pit	1865	2212720
AQ	446m SE	Tramway Sidings	1938	2243934
AE	447m NW	Gasometer	1895	2222190
AF	448m SE	Railway Sidings	1907	2276868
AJ	449m SE	Unspecified Pits	1955	2141813
AO	450m S	Chalk Pit	1932 - 1938	2222966
AE	450m W	Unspecified Tanks	1895	2176477
AE	451m W	Unspecified Tank	1865	2155362
N	452m SE	Unspecified Tanks	1932	2284856
AE	452m NW	Unspecified Industrial/Commercial	1888	2164943
N	453m SE	Unspecified Tanks	1938	2280916
AF	453m SE	Railway Sidings	1923	2255519
15	454m NE	Railway Sidings	1955 - 1966	2267789
AR	455m NE	Railway Sidings	1982 - 1992	2257573
AO	455m S	Refuse Heap	1946	2246271
AL	457m S	Tunnel	1946	2151572
AE	457m W	Unspecified Pit	1895	2169819
AE	459m W	Unspecified Tanks	1888	2194428

ID	Location	Land use	Dates present	Group ID
AE	459m W	Unspecified Tanks	1895	2192420
AS	461m S	Tramway Sidings	1946	2151152
AS	461m S	Chalk Pit	1946	2294193
AS	461m S	Gravel Pit	1977	2139097
AE	462m W	Unspecified Tanks	1971	2226113
AE	462m W	Unspecified Tanks	1990	2255661
AE	462m W	Unspecified Tanks	1977	2259554
AE	463m W	Unspecified Tanks	1898	2201962
AE	463m W	Unspecified Tanks	1898	2236772
AE	465m NW	Railway Sidings	1865	2222502
N	466m SE	Unspecified Ground Workings	1955	2134364
AL	466m S	Pump House	1990	2168094
AE	468m W	Railway Sidings	1895	2251914
AE	468m W	Railway Sidings	1907	2252281
AT	469m SW	Railway Sidings	1977 - 1990	2188509
AL	469m S	Pumping House	1946	2165293
AE	470m W	Railway Sidings	1888	2192901
AS	470m S	Unspecified Ground Workings	1955 - 1966	2227645
17	470m N	Railway Sidings	1946	2249066
AJ	471m SE	Tunnel	1938	2183707
AE	472m W	Tunnel	1923	2259105
AU	472m E	Tyre Works	1932	2182901
AM	472m S	Chalk Pit	1932 - 1938	2281142
AV	473m E	Electric Cable Works	1938	2176153
AV	473m E	Electric Cable Works	1916	2233623
AV	473m E	Printing Works	1938	2221904
AD	473m NW	Unspecified Wharf	1938	2178135
AU	474m E	Tyre Works	1946	2291549

ID	Location	Land use	Dates present	Group ID
18	474m SW	Pump House	1990	2168095
AU	474m E	Unspecified Pit	1916 - 1923	2238306
AD	475m NW	Unspecified Wharf	1932	2233903
AG	476m E	Unspecified Heap	1865	2137199
AE	476m NW	Unspecified Tanks	1888	2175225
AE	476m W	Railway Sidings	1898	2214748
AE	476m W	Railway Sidings	1898	2264451
AU	476m E	Unspecified Works	1955	2160150
AE	477m NW	Unspecified Tanks	1895	2211867
AE	478m W	Unspecified Tanks	1888	2199678
AT	478m SW	Old Chalk Pit	1946	2165646
AV	478m E	Electric Cable Works	1907	2241347
AU	479m E	Unspecified Pit	1907	2249288
AE	479m W	Unspecified Tanks	1895 - 1898	2216730
AE	480m NW	Unspecified Tanks	1923	2283061
AE	480m NW	Tramway Sidings	1946	2268642
AV	480m E	Electric Cable Works	1923	2195494
AE	480m W	Railway Sidings	1923	2291062
AO	481m S	Refuse Heap	1966	2200866
AE	481m NW	Unspecified Tanks	1898	2182105
AE	481m NW	Unspecified Tanks	1898	2188352
AE	481m W	Tunnel	1932 - 1946	2223839
AE	481m W	Unspecified Tanks	1923	2228776
AW	482m S	Cuttings	1938	2179832
AE	482m NW	Unspecified Tanks	1907	2228774
AE	482m W	Tunnel	1938	2246210
AE	483m W	Tunnel	1907 - 1916	2258760
AE	483m NW	Unspecified Tank	1938	2155383

ID	Location	Land use	Dates present	Group ID
AE	484m W	Unspecified Tanks	1907	2254171
AE	484m NW	Unspecified Tanks	1938	2206761
AE	484m NW	Tanks	1916	2162275
AE	485m W	Railway Sidings	1895	2203719
AE	485m NW	Unspecified Tanks	1923	2221188
AT	486m SW	Unspecified Pit	1966	2126196
19	486m E	Engineering Works	1932 - 1938	2262564
20	487m NW	Cement Works	1898	2205395
AE	487m NW	Unspecified Tanks	1907	2172383
AE	487m W	Tunnel	1938	2224324
AW	487m S	Cuttings	1938	2217009
AW	488m S	Cuttings	1898	2294425
AE	489m NW	Unspecified Tank	1938	2155381
AE	489m W	Unspecified Tank	1938	2155363
AE	490m NW	Unspecified Tanks	1938	2209059
AE	490m NW	Unspecified Tank	1938	2155382
AE	490m W	Unspecified Tanks	1938	2277130
AE	490m W	Tanks	1916	2162288
AE	490m NW	Tanks	1916	2162273
AE	494m W	Unspecified Quarry	1865	2145149
AE	496m W	Unspecified Ground Workings	1923	2282743
AE	497m W	Unspecified Tank	1938	2155364
AE	497m NW	Unspecified Tank	1938	2155379
AT	498m SW	Unspecified Ground Workings	1955	2134374

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	95

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13 >**

ID	Location	Land use	Dates present	Group ID
B	**On site**	**Unspecified Tank**	**1898**	**369226**
B	**On site**	**Unspecified Tank**	**1909**	**369227**
B	**On site**	**Unspecified Tank**	**1897 - 1909**	**391166**
C	**On site**	**Unspecified Tank**	**1985**	**369190**
C	**On site**	**Tanks**	**1985**	**378147**
C	**On site**	**Tanks**	**1960 - 1985**	**382860**
F	**On site**	**Unspecified Tank**	**1973**	**369229**
F	**On site**	**Unspecified Tank**	**1993**	**369230**
F	**On site**	**Tanks**	**1993**	**378183**
F	**On site**	**Tanks**	**1993**	**378184**
F	**On site**	**Tanks**	**1993**	**378185**
F	**On site**	**Unspecified Tank**	**1959 - 1973**	**381832**
F	**On site**	**Unspecified Tank**	**1964**	**407667**
H	**On site**	**Unspecified Tank**	**1993**	**369228**
4	0m SW	Tanks	1993	378153
C	69m NE	Unspecified Tank	1952	387528
G	78m NW	Tanks	1897 - 1898	406759
G	82m NW	Unspecified Tank	1952	403906
G	83m NW	Unspecified Tank	1952	385078
G	84m NW	Unspecified Tank	1933 - 1939	405527
C	88m NE	Unspecified Tank	1952	397618

ID	Location	Land use	Dates present	Group ID
C	88m NE	Unspecified Tank	1972	369196
U	98m S	Unspecified Tank	1865	369231
O	107m SW	Unspecified Tank	1980 - 1994	409391
G	112m NW	Unspecified Tank	1897	369195
G	116m NW	Unspecified Tank	1898	369194
C	125m E	Unspecified Tank	1973	369197
G	147m NW	Unspecified Tank	1972	369191
G	163m W	Tanks	1980 - 1994	386124
G	168m NW	Unspecified Tank	1972	369192
G	175m NW	Unspecified Tank	1897 - 1909	410620
Y	205m E	Unspecified Tank	1952	384244
G	227m NW	Tanks	1898 - 1909	380616
G	242m NW	Tanks	1898 - 1972	409855
G	244m NW	Tanks	1972	378197
G	247m NW	Tanks	1972	378196
X	256m E	Unspecified Tank	1985	369189
X	291m E	Unspecified Tank	1909	396103
X	298m E	Unspecified Tank	1933 - 1939	394287
N	303m E	Tanks	1975 - 1993	402860
N	309m E	Unspecified Tank	1975 - 1985	409783
Z	317m W	Unspecified Tank	1980 - 1994	400171
X	318m E	Unspecified Tank	1909	369180
G	323m W	Unspecified Tank	1980 - 1994	385259
N	330m SE	Unspecified Tank	1975 - 1985	401329
X	339m E	Unspecified Tank	1909 - 1939	381436
X	342m E	Tanks	1933	378148
G	349m NW	Unspecified Tank	1952	369193
Z	351m W	Unspecified Tank	1865 - 1909	383759

ID	Location	Land use	Dates present	Group ID
X	352m E	Unspecified Tank	1952	369182
G	354m NW	Unspecified Tank	1952 - 1964	383793
AC	363m W	Unspecified Tank	1865	369225
N	372m E	Unspecified Tank	1909	369179
AH	376m SW	Unspecified Tank	1897	369233
AE	386m NW	Unspecified Tank	1952	397186
AE	390m NW	Unspecified Tank	1898 - 1932	401939
AE	392m NW	Unspecified Tank	1898 - 1939	405569
AE	394m W	Unspecified Tank	1972	369198
AE	396m NW	Gas Works	1898	409673
N	398m SE	Unspecified Tank	1985	381398
N	399m SE	Unspecified Tank	1975	386616
AC	412m W	Unspecified Tank	1972 - 1980	405159
AC	413m W	Unspecified Tank	1994	392725
AC	414m W	Unspecified Tank	1932 - 1938	385333
N	418m SE	Unspecified Tank	1933	393294
N	419m SE	Unspecified Tank	1897	409453
N	428m SE	Tanks	1933	378154
AE	428m NW	Gas Works	1898 - 1909	401381
AE	433m NW	Unspecified Tank	1952 - 1964	384701
AE	433m NW	Unspecified Tank	1952	395028
AE	438m NW	Tanks	1932	378198
AE	438m NW	Gasometers	1898 - 1939	391499
AE	440m NW	Gasometer	1898	374083
AE	443m W	Unspecified Tank	1909 - 1938	394403
AE	443m W	Gasometer	1897 - 1898	400746
AE	445m NW	Gasometer	1898	374084
AC	449m W	Tanks	1970	394401

ID	Location	Land use	Dates present	Group ID
AC	449m W	Tanks	1979 - 1986	403371
AC	454m W	Unspecified Tank	1865	369224
AE	462m W	Tanks	1897 - 1909	381405
AE	462m W	Unspecified Tank	1972	369200
AE	466m W	Tanks	1898	388736
AE	468m NW	Unspecified Tank	1952 - 1964	385464
AE	468m NW	Unspecified Tank	1952	402135
AL	470m S	Unspecified Tank	1952	407279
AE	476m NW	Unspecified Tank	1972	369199
AE	480m NW	Unspecified Tanks	1907	379245
AE	481m NW	Tanks	1909	381354
AE	481m NW	Tanks	1897	410197
AE	482m W	Tanks	1897 - 1909	400621
AE	485m NW	Tanks	1898	398666
AE	487m W	Tanks	1898	404619
AE	488m NW	Unspecified Tanks	1907	379246
AU	495m E	Unspecified Tank	1933	369181
AR	498m NE	Unspecified Tank	1950	368818

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	63

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13 >**

ID	Location	Land use	Dates present	Group ID
B	**On site**	**Electricity Substation**	**1973 - 1993**	**261926**
5	35m S	Electricity Substation	1952	248018
D	54m E	Electricity Substation	1952	287687
Q	82m W	Electricity Transformers	1972 - 1980	283608
Q	87m W	Electricity Substation	1994	248020
U	96m S	Electricity Substation	1993	248010
U	98m S	Electricity Transformer	1972	250859
G	102m NW	Electricity Transformers	1972	251667
G	103m NW	Electricity Transformer	1972	250878
G	108m NW	Electricity Substation	1985	248027
G	115m W	Electricity Transformer	1980	255836
G	116m W	Electricity Transformer	1972	252333
G	119m W	Electricity Transformer	1980	267602
G	120m W	Electricity Substation	1952 - 1994	273473
G	120m W	Electricity Transformer	1972	255204
G	137m W	Electricity Transformers	1972 - 1980	264662
G	138m W	Electricity Substation	1994	248024
G	161m NW	Electricity Transformers	1972	251666
G	163m W	Electricity Transformers	1972 - 1980	263528
G	164m W	Electricity Substation	1994	248025
G	174m W	Electricity Transformers	1972 - 1980	273832
G	190m W	Electricity Transformers	1980	255837
G	191m W	Electricity Transformers	1972	253897
G	199m W	Electricity Transformers	1972 - 1980	265199
G	201m W	Electricity Substation	1994	248028
G	207m W	Electricity Transformers	1980	253630
G	208m W	Electricity Transformers	1972	255203
G	209m W	Electricity Substation	1994	248015

ID	Location	Land use	Dates present	Group ID
G	210m W	Electricity Transformers	1972 - 1980	282969
G	222m W	Electricity Transformers	1980	291870
X	222m E	Power Station	1985 - 1993	270815
G	223m W	Electricity Transformers	1972	254350
X	223m E	Power Station	1975	260218
G	231m W	Electricity Substation	1994	248022
G	234m W	Electricity Transformers	1972	253054
G	236m W	Electricity Transformers	1972 - 1980	283875
G	237m W	Electricity Substation	1994	248030
G	247m W	Electricity Transformer	1972 - 1980	268682
G	259m W	Electricity Transformer	1972 - 1980	272753
G	261m W	Electricity Substation	1994	248021
X	279m E	Electricity Substation	1952	288232
N	299m SE	Electricity Substation	1985 - 1993	266845
N	299m SE	Electricity Transformers	1975	251668
G	329m W	Electricity Transformers	1980	251665
G	329m W	Electricity Transformer	1972	250880
G	330m W	Electricity Transformers	1972	251664
AB	367m S	Electricity Transformer	1972	250860
AI	383m SW	Electricity Transformer	1972 - 1980	268840
AI	385m SW	Electricity Substation	1994	248016
AE	396m NW	Gas Works	1898	260678
AN	409m E	Electricity Transformer	1975	250884
AE	410m NW	Disused Gas Works	1939	251267
AN	427m E	Electricity Substation	1985	267760
AE	428m NW	Gas Works	1898 - 1909	262911
AN	429m E	Electricity Substation	1993 - 1995	275831
AE	438m NW	Gasometers	1898 - 1939	279285

ID	Location	Land use	Dates present	Group ID
AE	439m NW	Gasometer	1898	251565
AE	443m W	Gasometer	1897 - 1898	288350
AE	445m NW	Gasometer	1898	251566
T	445m SW	Electricity Substation	1972	248009
16	459m S	Electricity Transformer	1972	250858
AL	467m S	Electricity Transformer	1972	250856
AL	474m S	Electricity Transformer	1972	250857

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	6

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13 >**

ID	Location	Land use	Dates present	Group ID
6	37m E	Garage	1952	84956
7	61m SW	Garage	1952 - 1964	80086
AB	346m S	Garage	1952	85649
AO	421m S	Garage	1952	76809

ID	Location	Land use	Dates present	Group ID
AO	422m S	Garage	1972	75549
AO	422m S	Garage	1952	78122

This data is sourced from Ordnance Survey / Groundsure.

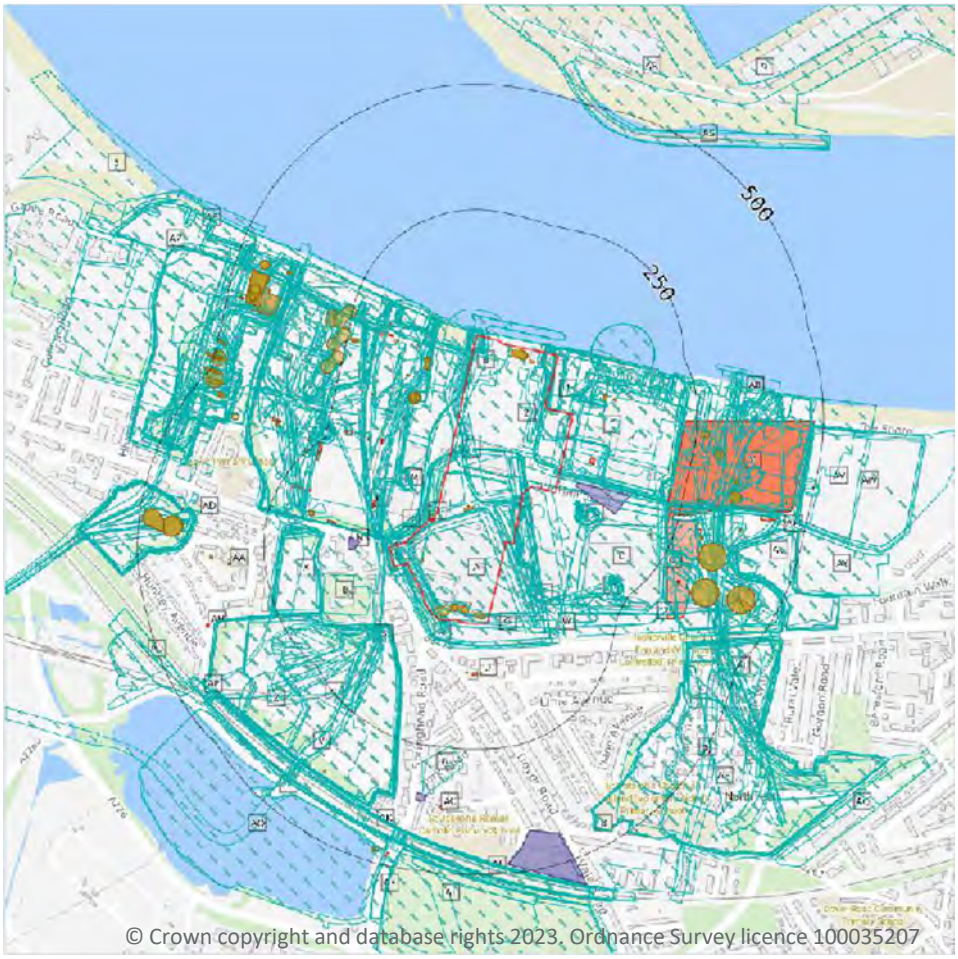
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

2.1 Historical industrial land uses

Records within 500m	861

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45 >**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Tramway Sidings**	**1938**	**2259493**
2	**On site**	**Mineral Railway Sidings**	**1966**	**2240800**
A	**On site**	**Brick Works**	**1895**	**2173447**

ID	Location	Land Use	Date	Group ID
A	On site	Railway Sidings	1895	2202854
A	On site	Brick Works	1923	2178411
A	On site	Brick Works	1923	2265241
A	On site	Unspecified Ground Workings	1946	2134370
A	On site	Brick Works	1907	2178411
A	On site	Railway Sidings	1907	2212158
A	On site	Railway Sidings	1895	2284631
A	On site	Brick Works	1895	2178411
A	On site	Railway Sidings	1865	2219488
A	On site	Brick Works	1916	2178411
A	On site	Tramway Sidings	1916	2272871
A	On site	Railway Sidings	1888	2180279
A	On site	Unspecified Tank	1888	2155360
A	On site	Brick Works	1888	2178411
A	On site	Railway Sidings	1898	2193616
A	On site	Brick Works	1898	2178411
A	On site	Railway Sidings	1898	2279934
A	On site	Brick Works	1898	2178411
A	On site	Unspecified Heap	1955	2137192
A	On site	Paper Mill	1990	2163242
A	On site	Unspecified Mills	1977	2206547
A	On site	Unspecified Mills	1971	2206547
A	On site	Unspecified Commercial/Industrial	1966	2131133
B	On site	Unspecified Foundry	1895	2257006
B	On site	Tramway Sidings	1923	2289529
B	On site	Unspecified Wharf	1865	2261188
B	On site	Unspecified Wharf	1955	2203811
B	On site	Unspecified Foundry	1888	2257006

ID	Location	Land Use	Date	Group ID
B	On site	Unspecified Wharves	1888	2225973
B	On site	Unspecified Wharves	1898	2194823
B	On site	Unspecified Wharves	1898	2194823
B	On site	Railway Sidings	1938	2235239
B	On site	Unspecified Wharves	1938	2267097
B	On site	Railway Sidings	1938	2182970
B	On site	Cement Works	1938	2264284
B	On site	Unspecified Wharves	1938	2267097
B	On site	Unspecified Wharves	1938	2267097
B	On site	Unspecified Wharves	1938	2267097
C	On site	Disused Dockyard	1895	2206513
C	On site	Old Dock	1895	2202877
C	On site	Old Dock	1923	2257119
C	On site	Disused Dock	1923	2164754
C	On site	Paper Mill	1946	2187262
C	On site	Tramway Sidings	1946	2295288
C	On site	Tramway Sidings	1932	2183788
C	On site	Paper Mill	1932	2260367
C	On site	Disused Dockyard	1907	2290228
C	On site	Old Dock	1907	2236667
C	On site	Unspecified Foundry	1895	2140137
C	On site	Disused Dockyard	1895	2175883
C	On site	Old Dock	1895	2276300
C	On site	Unspecified Factory	1865	2151044
C	On site	Dock Yard	1865	2135653
C	On site	Disused Dockyard	1916	2188060
C	On site	Old Dock	1916	2257119
C	On site	Unspecified Heap	1916	2137179

ID	Location	Land Use	Date	Group ID
C	On site	Old Dock	1888	2182299
C	On site	Disused Dockyard	1888	2176821
C	On site	Unspecified Foundry	1898	2238796
C	On site	Disused Dockyard	1898	2288867
C	On site	Old Dock	1898	2276300
C	On site	Unspecified Foundry	1898	2238796
C	On site	Disused Dockyard	1898	2288867
C	On site	Old Dock	1898	2276300
C	On site	Unspecified Mills	1955	2139422
C	On site	Mineral Railway Sidings	1955	2240800
C	On site	Unspecified Ground Workings	1955	2134371
C	On site	Paper Mill	1938	2260367
C	On site	Unspecified Tanks	1990	2218498
C	On site	Unspecified Warehouse	1990	2138636
C	On site	Unspecified Tanks	1977	2218498
C	On site	Unspecified Mill	1977	2273577
C	On site	Railway Sidings	1977	2275768
C	On site	Unspecified Tanks	1971	2218498
C	On site	Unspecified Mill	1971	2273577
C	On site	Railway Sidings	1971	2256057
C	On site	Unspecified Mill	1966	2273577
C	On site	Unspecified Tanks	1966	2218498
D	On site	Disused Cement Works	1946	2263565
E	On site	Unspecified Ground Workings	1946	2292333
E	On site	Unspecified Heap	1895	2250110
E	On site	Unspecified Heap	1865	2137193
E	On site	Unspecified Ground Workings	1888	2195293
E	On site	Unspecified Ground Workings	1898	2202804

ID	Location	Land Use	Date	Group ID
E	**On site**	**Unspecified Ground Workings**	**1898**	**2202804**
E	**On site**	**Unspecified Heap**	**1938**	**2291476**
E	**On site**	**Unspecified Heap**	**1938**	**2237069**
E	**On site**	**Unspecified Heap**	**1955**	**2284324**
E	**On site**	**Unspecified Heap**	**1938**	**2291476**
F	**On site**	**Unspecified Ground Workings**	**1932**	**2202051**
F	**On site**	**Railway Sidings**	**1865**	**2254252**
G	**On site**	**Rifle Range**	**1865**	**2164820**
G	**On site**	**Unspecified Heap**	**1865**	**2137194**
G	**On site**	**Unspecified Tanks**	**1990**	**2218516**
G	**On site**	**Unspecified Tanks**	**1977**	**2236011**
G	**On site**	**Unspecified Tanks**	**1971**	**2236011**
G	**On site**	**Unspecified Tank**	**1966**	**2155361**
H	**On site**	**Unspecified Ground Workings**	**1916**	**2271894**
H	**On site**	**Unspecified Ground Workings**	**1938**	**2230096**
H	**On site**	**Unspecified Ground Workings**	**1938**	**2277015**
I	**On site**	**Smithy**	**1888**	**2262861**
I	**On site**	**Smithy**	**1898**	**2265865**
I	**On site**	**Smithy**	**1898**	**2265865**
I	**On site**	**Unspecified Pit**	**1955**	**2200393**
I	**On site**	**Unspecified Pit**	**1977**	**2200393**
I	**On site**	**Unspecified Pit**	**1971**	**2200393**
I	**On site**	**Unspecified Pit**	**1966**	**2200393**
J	**On site**	**Unspecified Tank**	**1990**	**2253261**
J	**On site**	**Unspecified Tank**	**1977**	**2253261**
J	**On site**	**Unspecified Tank**	**1971**	**2253261**
J	**On site**	**Unspecified Tank**	**1966**	**2253261**
C	1m NE	Cuttings	1865	2129957

ID	Location	Land Use	Date	Group ID
B	2m N	Unspecified Works	1990	2245584
B	2m N	Unspecified Works	1977	2249897
B	2m N	Unspecified Works	1971	2224509
C	3m NE	Unspecified Wharf	1955	2258935
B	3m N	Portland Cement Works	1938	2142882
B	3m N	Cement Works	1916	2201048
B	6m N	Unspecified Wharf	1966	2203811
B	8m N	Unspecified Wharves	1907	2235374
I	8m SW	Smithy	1895	2167463
B	11m N	Unspecified Wharves	1946	2203805
I	12m SW	Smithy	1895	2167464
B	12m N	Unspecified Tank	1865	2155385
B	12m N	Unspecified Wharves	1932	2230920
B	13m SW	Railway Sidings	1971	2198214
I	13m SW	Tunnel	1971	2204151
I	13m SW	Tunnel	1990	2206369
B	13m SW	Railway Sidings	1990	2189766
B	14m N	Cement Works	1907	2212428
B	14m N	Cement Works	1895	2199577
E	16m SE	Lime Kilns	1865	2137927
B	21m SW	Unspecified Commercial/Industrial	1938	2189289
K	21m SW	Tunnels	1865	2164893
B	22m N	Cement Works	1895	2199361
B	22m SW	Tramway Sidings	1932	2172445
B	22m SW	Unspecified Commercial/Industrial	1932	2189289
K	22m SW	Tunnels	1865	2164895
B	23m SW	Railway Sidings	1907	2233255
B	23m SW	Railway Sidings	1895	2273890

ID	Location	Land Use	Date	Group ID
E	23m SE	Unspecified Heap	1865	2137191
B	24m SW	Unspecified Works	1990	2226028
B	24m SW	Unspecified Works	1977	2276056
B	26m N	Unspecified Wharves	1923	2140515
C	26m NE	Chimney	1971	2238457
C	27m NE	Unspecified Ground Workings	1907	2227237
C	27m NE	Unspecified Ground Workings	1895	2274503
C	28m NE	Unspecified Ground Workings	1888	2201011
B	29m SW	Cement Works	1898	2199361
B	29m SW	Cement Works	1898	2199361
B	30m SW	Cement Works	1923	2222770
B	30m SW	Tramway Sidings	1923	2200679
B	31m SW	Railway Sidings	1888	2211643
B	31m SW	Cement Works	1888	2207749
C	31m NE	Unspecified Ground Workings	1898	2273898
C	31m NE	Unspecified Ground Workings	1898	2273898
C	32m NE	Unspecified Ground Workings	1895	2244711
B	33m SW	Tramway Sidings	1946	2217156
C	36m NE	Unspecified Ground Workings	1916	2186884
B	36m SW	Railway Sidings	1898	2232282
B	36m SW	Railway Sidings	1898	2232282
B	38m SW	Tramway Sidings	1916	2281823
C	40m E	Unspecified Tank	1946	2155352
L	42m E	Unspecified Heap	1938	2190527
L	42m E	Unspecified Heap	1938	2190527
L	44m E	Unspecified Ground Workings	1938	2243098
L	44m E	Unspecified Heap	1938	2247467
L	44m E	Unspecified Heap	1938	2247467

ID	Location	Land Use	Date	Group ID
L	45m E	Unspecified Ground Workings	1946	2218651
L	45m E	Unspecified Heap	1932	2247467
L	45m E	Unspecified Heap	1907	2171451
L	45m E	Unspecified Heap	1895	2284571
L	47m E	Unspecified Ground Workings	1916	2226673
B	47m SW	Railway Sidings	1895	2182495
L	49m SE	Unspecified Heap	1865	2137190
L	49m E	Unspecified Ground Workings	1898	2255009
L	49m E	Unspecified Ground Workings	1898	2255009
L	50m E	Unspecified Heap	1955	2228430
M	51m W	Unspecified Heap	1888	2290781
L	51m E	Unspecified Ground Workings	1895	2279092
L	51m E	Unspecified Ground Workings	1865	2181299
L	55m E	Unspecified Heap	1923	2278695
M	57m W	Unspecified Heap	1898	2191624
M	57m W	Unspecified Heap	1898	2191624
M	60m W	Unspecified Heap	1938	2242810
M	60m W	Unspecified Heap	1938	2242810
M	60m W	Unspecified Heap	1938	2242810
M	61m W	Unspecified Heap	1916	2261428
M	61m W	Unspecified Heap	1946	2264641
M	61m W	Unspecified Heap	1932	2214003
M	61m W	Unspecified Heap	1907	2191624
M	61m W	Unspecified Heap	1895	2191624
M	61m W	Unspecified Heap	1938	2247659
M	61m W	Unspecified Heap	1938	2247659
D	62m E	Railway Sidings	1971	2196674
O	62m E	Unspecified Works	1977	2282059

ID	Location	Land Use	Date	Group ID
O	62m E	Unspecified Works	1971	2282059
B	63m W	Railway Sidings	1977	2247460
L	64m E	Unspecified Ground Workings	1888	2279092
M	64m W	Unspecified Heap	1895	2251794
F	64m S	Unspecified Heap	1955	2257578
F	64m S	Unspecified Heap	1946	2256100
P	65m SW	Grave Yard	1865	2145773
C	67m NE	Unspecified Wharf	1990	2269518
C	67m NE	Unspecified Wharf	1977	2269518
C	67m NE	Unspecified Wharf	1971	2269518
C	67m NE	Unspecified Wharf	1966	2269518
F	67m S	Unspecified Heap	1938	2238615
F	69m S	Unspecified Heap	1938	2258960
F	69m S	Unspecified Heap	1938	2258960
F	74m S	Unspecified Heap	1888	2194788
B	75m N	Unspecified Wharves	1888	2257888
B	75m N	Unspecified Wharves	1895	2256295
B	79m N	Unspecified Wharves	1898	2269488
B	79m N	Unspecified Wharves	1898	2269488
B	80m N	Unspecified Wharf	1955	2251318
B	81m NW	Unspecified Tank	1932	2231785
B	81m NW	Unspecified Tank	1907	2243257
Q	82m SW	Chalk Pit	1938	2201799
Q	83m SW	Burial Ground	1977	2242377
Q	83m SW	Unspecified Disused Pit	1990	2185472
Q	83m SW	Unspecified Disused Pit	1977	2185472
B	83m N	Wharves	1916	2143216
B	83m NW	Railway Sidings	1938	2262245

ID	Location	Land Use	Date	Group ID
B	83m N	Railway Sidings	1938	2216955
B	83m N	Unspecified Wharves	1938	2224983
B	83m N	Unspecified Wharves	1938	2224983
Q	83m SW	Chalk Pit	1916	2206811
B	84m NW	Unspecified Tank	1946	2226120
B	84m NW	Unspecified Tank	1938	2178127
Q	84m SW	Chalk Pit	1898	2264989
Q	84m SW	Chalk Pit	1898	2264989
B	85m NW	Unspecified Tank	1955	2222567
Q	85m SW	Tramway Sidings	1907	2269038
Q	85m SW	Chalk Pit	1907	2228865
Q	86m SW	Chalk Pit	1938	2226835
Q	86m SW	Old Chalk Pit	1938	2169483
Q	86m SW	Burial Ground	1955	2214742
Q	86m SW	Burial Ground	1966	2214742
Q	87m SW	Chalk Pit	1923	2255946
Q	88m SW	Chalk Pit	1895	2264989
C	88m E	Unspecified Pit	1865	2126206
Q	89m SW	Tramway Sidings	1946	2210284
Q	89m SW	Old Chalk Pit	1946	2169483
C	90m NE	Chimney	1966	2261280
D	92m SE	Unspecified Works	1990	2202868
Q	92m SW	Chalk Pit	1895	2265909
Q	93m SW	Old Chalk Pit	1932	2195684
S	95m SW	Railway Sidings	1895	2234406
T	95m SW	Tramway Sidings	1938	2193577
Q	99m SW	Chalk Pit	1888	2260049
S	99m SW	Railway Sidings	1888	2229381

ID	Location	Land Use	Date	Group ID
V	99m SW	Tramway Sidings	1932	2210284
Q	100m SW	Tramway Sidings	1938	2210284
D	101m SE	Unspecified Heap	1955	2203412
Q	101m SW	Tramway Sidings	1938	2210284
B	102m W	Mineral Railway Sidings	1966	2164032
S	102m SW	Railway Sidings	1898	2196400
S	102m SW	Railway Sidings	1898	2239648
Q	105m SW	Tramway Sidings	1916	2216135
B	108m NW	Unspecified Wharves	1888	2228901
Q	111m SW	Mineral Railway Sidings	1966	2164033
Q	114m SW	Tramway Sidings	1923	2210284
C	118m E	Unspecified Pit	1865	2126205
B	120m NW	Unspecified Ground Workings	1955	2193520
B	120m NW	Unspecified Ground Workings	1966	2193520
B	122m NW	Unspecified Ground Workings	1932	2214691
B	123m NW	Unspecified Heap	1938	2281542
B	123m NW	Unspecified Heap	1938	2281542
B	126m NW	Unspecified Wharves	1938	2188799
B	126m NW	Unspecified Wharves	1938	2188799
W	128m SE	Unspecified Heap	1946	2226084
X	132m W	Old Chalk Pit	1888	2201073
X	132m W	Old Chalk Pit	1895	2194464
B	133m NW	Unspecified Ground Workings	1938	2251848
B	133m NW	Unspecified Ground Workings	1938	2251848
D	133m SE	Unspecified Ground Workings	1888	2240550
B	133m NW	Chimney	1990	2214577
B	133m NW	Chimney	1977	2214577
B	133m NW	Unspecified Tank	1971	2155384

ID	Location	Land Use	Date	Group ID
W	134m SE	Unspecified Heap	1955	2226084
X	135m W	Unspecified Disused Pit	1990	2214208
X	135m W	Unspecified Disused Pit	1977	2214208
X	135m W	Old Chalk Pit	1898	2174323
X	135m W	Old Chalk Pit	1898	2174323
X	137m W	Unspecified Pit	1923	2275681
X	138m W	Unspecified Pit	1955	2175080
X	138m W	Unspecified Pit	1966	2175080
X	144m W	Old Chalk Pit	1895	2201073
B	145m W	Unspecified Ground Workings	1865	2134372
B	148m W	Unspecified Pit	1955	2248034
B	148m W	Unspecified Pit	1966	2248034
B	155m NW	Unspecified Wharves	1898	2173374
B	155m NW	Unspecified Wharves	1898	2173374
D	156m SE	Unspecified Ground Workings	1895	2240550
B	159m W	Railway Sidings	1895	2221164
B	159m NW	Unspecified Wharves	1932	2233409
B	159m W	Unspecified Commercial/Industrial	1946	2177592
D	161m SE	Unspecified Ground Workings	1932	2224506
B	163m W	Railway Sidings	1888	2212090
B	164m NW	Unspecified Wharf	1865	2288737
B	164m NW	Tramway Sidings	1865	2229224
B	170m W	Railway Sidings	1898	2231608
B	170m W	Railway Sidings	1898	2232469
B	179m W	Cement Works	1923	2222770
B	179m W	Unspecified Heaps	1955	2268760
B	179m W	Unspecified Heaps	1966	2268760
B	181m W	Cement Works	1888	2199361

ID	Location	Land Use	Date	Group ID
B	182m W	Tunnel	1971	2151567
B	183m W	Cement Works	1938	2260164
B	184m NW	Unspecified Wharves	1946	2213252
B	185m W	Cement Works	1898	2199361
B	185m W	Cement Works	1898	2199361
5	189m NW	Unspecified Wharf	1895	2270164
B	190m NW	Tramway Sidings	1865	2178519
B	193m W	Railway Sidings	1888	2190216
B	194m NW	Unspecified Works	1955	2196647
B	194m NW	Unspecified Works	1966	2196647
B	196m W	Brick Works	1895	2213430
D	197m SE	Unspecified Pit	1865	2126202
B	198m W	Railway Sidings	1898	2200731
B	198m W	Railway Sidings	1898	2200731
B	199m NW	Brick Works	1895	2211016
B	199m NW	Cement Works	1907	2271974
D	199m SE	Unspecified Heap	1938	2200919
D	199m SE	Unspecified Heap	1938	2262977
D	199m SE	Unspecified Heap	1938	2262977
Y	201m E	Cement Works	1916	2172745
D	203m SE	Unspecified Ground Workings	1898	2236289
D	203m SE	Unspecified Ground Workings	1898	2265691
B	203m W	Railway Sidings	1895	2200731
D	203m SE	Unspecified Heap	1946	2284826
D	203m SE	Unspecified Heap	1895	2274163
Y	204m E	Cement Works	1907	2178945
D	206m SE	Unspecified Heap	1907	2277284
B	207m NW	Chimney	1990	2276814

ID	Location	Land Use	Date	Group ID
B	207m NW	Chimney	1977	2276814
B	207m NW	Unspecified Tank	1971	2155386
B	207m W	Unspecified Ground Workings	1865	2134373
Y	208m E	Cement Works	1923	2261569
D	210m SE	Unspecified Heap	1923	2200919
B	211m W	Unspecified Pit	1895	2126199
O	213m E	White Lead Works	1895	2178157
B	217m W	Gravel Pit	1966	2139095
B	217m W	Refuse Heap	1955	2213837
Y	218m E	Power Station	1977	2196236
O	220m E	Whiting Works	1916	2239701
O	220m E	Whiting Works	1938	2183039
O	220m E	Whiting Works	1938	2217810
Y	220m E	Unspecified Works	1971	2289828
Y	220m E	Unspecified Works	1966	2289828
O	221m E	Disused Cement Works	1932	2171407
O	222m E	Disused Cement Works	1938	2263565
B	222m NW	Gas Works	1895	2135574
O	223m E	Lead Works	1898	2173024
O	223m E	Lead Works	1898	2173024
O	223m E	Railway Sidings	1865	2180092
O	226m E	Unspecified Commercial/Industrial	1907	2241032
O	226m E	White Lead Works	1895	2284295
O	227m E	White Lead Works	1888	2284295
B	227m NW	Unspecified Wharves	1938	2256480
B	227m NW	Unspecified Wharves	1938	2256480
Y	227m E	Railway Sidings	1907	2278942
B	228m NW	Unspecified Wharves	1932	2256480

ID	Location	Land Use	Date	Group ID
O	228m E	Lime Kilns	1865	2137925
B	229m NW	Railway Sidings	1938	2231939
B	229m NW	Railway Sidings	1938	2293485
B	229m NW	Railway Sidings	1916	2253026
B	234m W	Unspecified Heap	1907	2225807
B	234m W	Unspecified Heap	1895	2225807
O	234m E	Railway Sidings	1916	2207145
B	236m W	Unspecified Ground Workings and Heap	1888	2138421
O	236m E	Whiting Works	1923	2182525
B	237m W	Unspecified Heap	1898	2225807
B	237m W	Unspecified Heap	1898	2225807
B	237m W	Unspecified Heap	1916	2224608
B	238m NW	Unspecified Tanks	1990	2203595
B	238m NW	Unspecified Tanks	1977	2203595
B	238m NW	Unspecified Tanks	1971	2203595
B	239m W	Unspecified Heap	1938	2198347
B	239m W	Unspecified Heap	1938	2198347
B	240m W	Unspecified Heap	1938	2177199
Y	240m E	Power Station	1990	2196236
B	240m W	Refuse Heap	1907	2283287
B	242m W	Unspecified Heap	1946	2260825
B	242m W	Unspecified Ground Workings	1932	2260766
B	243m W	Unspecified Ground Workings	1938	2283864
B	243m W	Unspecified Ground Workings	1938	2283864
B	245m W	Unspecified Heap	1895	2284148
6	245m S	Barrack Field	1865	2162777
B	246m W	Refuse Heap	1895	2266317
B	246m W	Unspecified Heap	1946	2198347

ID	Location	Land Use	Date	Group ID
B	249m W	Refuse Heap	1898	2185867
B	249m W	Refuse Heap	1898	2185867
Y	249m E	Cement Works	1923	2276410
B	251m NW	Unspecified Ground Workings	1865	2278654
B	252m NW	Unspecified Ground Workings	1888	2289276
B	252m NW	Unspecified Heap	1895	2231545
B	255m W	Unspecified Heap	1865	2137189
B	256m NW	Unspecified Ground Workings	1898	2260961
B	256m NW	Unspecified Ground Workings	1898	2260961
B	258m W	Unspecified Heap	1955	2273343
B	258m W	Unspecified Heap	1966	2273343
B	258m W	Refuse Heap	1895	2266317
O	258m E	Unspecified Ground Workings	1932	2290262
B	258m NW	Unspecified Heap	1923	2285804
O	260m E	Unspecified Pit	1946	2126201
B	260m NW	Unspecified Heaps	1907	2160807
B	262m NW	Railway Sidings	1888	2287501
O	262m E	Unspecified Ground Workings	1938	2271529
O	262m E	Unspecified Ground Workings	1938	2271529
B	262m NW	Unspecified Ground Workings	1916	2187722
B	265m NW	Unspecified Ground Workings	1895	2278654
B	266m NW	Unspecified Tanks	1888	2270541
B	266m NW	Railway Sidings	1898	2203069
B	266m NW	Railway Sidings	1898	2182140
B	267m NW	Railway Sidings	1955	2208314
B	267m NW	Unspecified Tanks	1895	2270541
B	268m NW	Unspecified Tanks	1923	2269182
B	270m NW	Unspecified Tanks	1898	2270541

ID	Location	Land Use	Date	Group ID
B	270m NW	Unspecified Tanks	1898	2270541
B	270m NW	Unspecified Tanks	1907	2193341
O	272m E	Railway Sidings	1895	2268619
B	274m NW	Unspecified Heap	1946	2244889
B	274m NW	Unspecified Heap	1938	2244889
B	274m NW	Unspecified Heap	1938	2244889
B	274m NW	Railway Sidings	1966	2239807
B	274m NW	Tanks	1916	2162274
B	275m NW	Unspecified Heap	1932	2247677
B	276m NW	Unspecified Ground Workings	1946	2248616
B	277m NW	Unspecified Heap	1955	2219062
B	277m NW	Unspecified Heap	1966	2219062
B	277m NW	Unspecified Tanks	1895	2270541
Y	278m E	Railway Sidings	1895	2178142
O	280m SE	Tramway Sidings	1932	2270302
O	282m E	Railway Sidings	1898	2249046
O	282m E	Railway Sidings	1898	2249046
Y	284m E	Disused Cement Works	1938	2258554
O	286m E	Railway Sidings	1888	2230386
Y	289m E	Unspecified Tank	1946	2272305
Y	290m E	Tank	1916	2140334
O	290m E	Tramway Sidings	1923	2209466
Y	294m E	Unspecified Tank	1932	2223889
Y	294m E	Unspecified Tank	1907	2264045
Y	295m E	Unspecified Works	1971	2223965
Y	295m E	Unspecified Works	1966	2223965
Y	296m E	Unspecified Tank	1938	2243937
B	296m W	Unspecified Heaps	1865	2160806

ID	Location	Land Use	Date	Group ID
Y	297m E	Unspecified Tank	1923	2223889
O	301m E	Unspecified Works	1990	2202868
V	305m SW	Cuttings	1955	2250541
V	305m SW	Cuttings	1966	2250541
Y	305m E	Disused Cement Works	1932	2174372
Y	306m E	Disused Cement Works	1946	2248542
Z	306m SW	Burial Ground	1977	2276672
Z	306m SW	Burial Ground	1971	2276672
B	307m NW	Unspecified Pit	1923	2287279
B	308m NW	Unspecified Pit	1907	2266377
7	310m SE	Unspecified Heap	1955	2137198
O	310m E	Unspecified Tanks	1990	2220603
O	310m E	Unspecified Tanks	1977	2186359
B	313m NW	Unspecified Pit	1916	2287279
O	315m E	Whiting Works	1895	2224774
AB	321m E	Unspecified Wharf	1895	2189541
AB	322m E	Unspecified Wharves	1938	2267802
AB	322m E	Unspecified Wharves	1938	2267802
AB	323m E	Unspecified Wharf	1946	2184902
AB	323m E	Unspecified Wharf	1895	2197099
O	324m E	Unspecified Commercial/Industrial	1916	2241032
AB	326m E	Unspecified Wharf	1888	2188208
O	330m E	Whiting Works	1907	2182525
O	330m E	Whiting Works	1895	2224774
AB	331m E	Railway Building	1895	2150385
AB	336m E	Unspecified Wharf	1898	2197099
AB	336m E	Unspecified Wharf	1898	2197099
Y	337m E	Tank	1916	2140336

ID	Location	Land Use	Date	Group ID
Y	338m E	Unspecified Tank	1946	2192348
Y	338m E	Unspecified Tanks	1932	2207974
Y	338m E	Unspecified Tanks	1938	2207974
Y	338m E	Unspecified Tank	1938	2198996
Y	339m E	Unspecified Pit	1895	2196465
Y	341m E	Unspecified Pit	1865	2246996
Y	342m E	Unspecified Tank	1955	2257393
Y	343m E	Unspecified Tank	1932	2268628
Y	343m E	Unspecified Tank	1907	2216981
AB	344m E	Railway Sidings	1865	2277546
Y	344m E	Unspecified Tank	1923	2263596
Y	345m E	Unspecified Pit	1898	2291256
Y	345m E	Unspecified Pit	1898	2291256
O	347m E	Whiting Works	1898	2253968
O	347m E	Whiting Works	1898	2253968
O	349m E	Railway Sidings	1938	2292502
B	349m W	Unspecified Heap	1932	2280363
Y	349m E	Unspecified Pit	1895	2193764
O	350m E	Whiting Works	1888	2208554
Y	350m E	Unspecified Pit	1888	2193764
B	350m W	Unspecified Heap	1938	2258662
B	350m W	Unspecified Heap	1938	2258662
B	352m W	Unspecified Ground Workings	1916	2253710
AB	356m E	Chimney	1990	2253934
AB	356m E	Chimney	1977	2253934
AB	356m E	Chimney	1971	2253934
AB	356m E	Chimney	1966	2253934
B	368m NW	Railway Sidings	1938	2194554

ID	Location	Land Use	Date	Group ID
AE	368m NW	Unspecified Works	1990	2267204
AE	368m NW	Unspecified Works	1977	2267204
B	368m NW	Unspecified Wharf	1895	2174813
AB	368m E	Unspecified Wharf	1932	2239534
B	368m NW	Railway Sidings	1938	2194554
B	369m NW	Unspecified Wharf	1946	2227580
B	369m NW	Unspecified Wharf	1932	2267120
O	369m E	Tank	1916	2140335
AB	369m E	Quay	1865	2139307
AF	370m SE	Chalk Pit	1938	2286029
AG	371m E	Old Chalk Pit	1895	2250767
B	373m NW	Refuse Heap	1938	2281695
B	373m NW	Refuse Heap	1938	2281695
B	374m NW	Refuse Heap	1946	2290801
O	374m E	Unspecified Tank	1907	2155355
AG	378m E	Unspecified Works	1955	2270972
B	379m W	Cement Works	1938	2245417
AB	380m E	Unspecified Wharf	1895	2282260
B	380m NW	Unspecified Wharf	1888	2250458
AG	380m E	Unspecified Ground Workings	1907	2280390
AG	380m E	Old Chalk Pit	1895	2287516
B	381m NW	Unspecified Wharf	1895	2182716
AD	381m W	Unspecified Tank	1938	2155300
B	381m W	Cement Works	1916	2198904
AG	382m E	Old Chalk Pit	1898	2234948
AG	382m E	Old Chalk Pit	1898	2234948
B	382m W	Unspecified Pit	1865	2126200
AG	382m E	Chalk Pit	1888	2157766

ID	Location	Land Use	Date	Group ID
V	383m SW	Tunnel	1990	2218238
V	383m SW	Tunnel	1977	2218238
AD	384m W	Unspecified Quarry	1888	2270926
AD	384m W	Tramway Sidings	1888	2189056
B	384m NW	Unspecified Wharf	1865	2250458
B	385m NW	Gas Works	1907	2197699
B	385m NW	Gas Works	1895	2197699
B	386m NW	Cement Works	1923	2227374
B	386m NW	Unspecified Wharf	1898	2227582
B	386m NW	Unspecified Wharf	1898	2227582
B	386m NW	Unspecified Tank	1966	2205104
AD	387m W	Quarry	1916	2143070
AF	387m SE	Old Chalk Pit	1932	2272466
B	387m NW	Unspecified Tank	1946	2264603
V	387m SW	Tunnel	1946	2259364
B	388m NW	Unspecified Tank	1932	2269509
AI	388m SE	Old Chalk Pit	1895	2291323
AF	388m SE	Unspecified Pit	1966	2254534
V	388m SW	Tunnel	1938	2259364
AF	389m SE	Old Chalk Pit	1946	2274267
AF	389m SE	Unspecified Pit	1955	2254534
AJ	389m SE	Disused Workings	1990	2144633
AJ	389m SE	Unspecified Pit	1990	2241389
AJ	389m SE	Unspecified Pit	1977	2241389
AJ	389m SE	Unspecified Pit	1971	2241389
V	389m SW	Tunnel	1932	2237676
V	389m SW	Tramway Sidings	1946	2210284
AD	389m W	Unspecified Quarry	1938	2212291

ID	Location	Land Use	Date	Group ID
AD	390m W	Unspecified Quarry	1898	2290194
AD	390m W	Unspecified Quarry	1898	2290194
AF	390m SE	Old Chalk Pit	1938	2274267
B	390m NW	Gas Works	1923	2197699
AD	390m W	Unspecified Quarry	1923	2222565
B	390m NW	Portland Cement Works	1938	2142881
B	391m NW	Unspecified Commercial/Industrial	1990	2131137
B	391m NW	Unspecified Works	1977	2285621
B	391m NW	Unspecified Works	1971	2285621
AD	391m W	Railway Sidings	1907	2272832
AD	391m W	Railway Sidings	1895	2272832
AD	391m W	Unspecified Old Quarry	1946	2240083
AD	391m W	Unspecified Old Quarry	1932	2204295
AD	391m W	Unspecified Quarry	1907	2290194
AD	391m W	Unspecified Quarry	1895	2290194
AD	392m W	Unspecified Quarry	1990	2180631
AD	392m W	Unspecified Old Quarry	1938	2219695
B	392m NW	Cement Works	1907	2198904
B	392m NW	Railway Sidings	1895	2201192
B	392m NW	Cement Works	1895	2190489
B	392m NW	Cement Works	1938	2255887
AD	393m W	Tramway Sidings	1923	2270090
B	393m NW	Cement Works	1932	2259850
AD	393m W	Unspecified Tank	1946	2155299
B	394m W	Unspecified Tank	1990	2178010
B	394m W	Unspecified Tank	1977	2178010
B	394m W	Unspecified Tank	1971	2178010
B	394m NW	Cement Works	1946	2269578

ID	Location	Land Use	Date	Group ID
AI	394m SE	Unspecified Works	1990	2227273
AD	394m W	Unspecified Ground Workings	1955	2134375
AD	394m W	Unspecified Pit	1966	2234234
AD	394m W	Unspecified Quarry	1938	2230336
B	395m NW	Brick Works	1898	2267552
B	395m NW	Brick Works	1898	2267552
B	396m NW	Railway Sidings	1888	2206474
AD	396m W	Unspecified Tank	1932	2155298
AI	396m SE	Old Chalk Pit	1898	2283604
AI	396m SE	Old Chalk Pit	1898	2283604
AF	396m SE	Chalk Pit	1916	2291806
B	397m NW	Gas Works	1916	2197699
O	397m E	Unspecified Pit	1971	2126194
V	399m SW	Cuttings	1907	2192325
V	399m SW	Cuttings	1895	2238165
B	399m NW	Tramway Sidings	1946	2244792
AI	400m SE	Old Chalk Pit	1888	2283604
B	400m NW	Railway Sidings	1898	2284790
B	400m NW	Railway Sidings	1898	2284790
B	400m NW	Tramway Sidings	1923	2280216
AK	400m SW	Cuttings	1938	2237041
AI	400m SE	Old Chalk Pit	1895	2283604
V	401m SW	Cuttings	1938	2251327
AD	401m W	Tramway Sidings	1895	2189056
AD	401m W	Unspecified Quarry	1895	2222667
V	401m SW	Cuttings	1895	2271612
B	401m W	Brick Works	1888	2266509
B	402m NW	Railway Sidings	1907	2256771

ID	Location	Land Use	Date	Group ID
T	402m SW	Cuttings	1946	2170626
AF	402m SE	Chalk Pit	1907	2182199
AK	402m S	Cuttings	1932	2264051
AD	402m W	Tramway Sidings	1898	2189056
AD	402m W	Tramway Sidings	1898	2189056
B	403m W	Railway Sidings	1916	2223194
B	403m NW	Gas Works	1895	2280294
B	403m NW	Railway Sidings	1895	2170939
B	404m W	Unspecified Pit	1895	2173101
T	404m SW	Cuttings	1932	2248862
AF	404m SE	Chalk Pit	1923	2231607
T	404m SW	Cuttings	1938	2248116
V	405m SW	Cuttings	1865	2186329
B	405m NW	Railway Sidings	1938	2185989
V	405m SW	Cuttings	1923	2179093
O	405m SE	Lime Kiln	1865	2166925
AB	405m E	Chimney	1990	2172660
AB	405m E	Chimney	1977	2172660
AB	405m E	Chimney	1971	2172660
AB	405m E	Chimney	1966	2172660
B	406m NW	Railway Sidings	1938	2185989
O	406m SE	Unspecified Tank	1895	2155359
B	407m W	Unspecified Ground Workings	1938	2200630
B	407m W	Unspecified Ground Workings	1938	2200630
AL	408m S	Cuttings	1938	2212837
AB	408m E	Unspecified Wharf	1946	2250583
B	409m W	Unspecified Pit	1923	2295096
B	409m W	Unspecified Ground Workings	1946	2195957

ID	Location	Land Use	Date	Group ID
AD	409m W	Unspecified Tanks	1990	2288161
AI	409m SE	Unspecified Works	1977	2227273
B	410m W	Unspecified Ground Workings	1938	2293261
B	410m W	Unspecified Ground Workings	1938	2293261
AK	411m S	Cuttings	1955	2274099
AK	411m S	Cuttings	1990	2250911
AK	411m S	Cuttings	1977	2250911
AK	411m S	Cuttings	1971	2250911
AL	411m S	Cuttings	1966	2256839
B	411m W	Unspecified Ground Workings	1932	2227340
B	411m W	Unspecified Ground Workings	1907	2187583
AE	411m NW	Unspecified Wharf	1946	2174998
B	412m W	Clay Mill	1865	2166682
B	413m W	Unspecified Ground Workings	1916	2245674
AD	413m W	Unspecified Tanks	1977	2221777
AD	413m W	Unspecified Tanks	1971	2221777
O	413m SE	Unspecified Tanks	1932	2277635
B	413m NW	Unspecified Wharf	1938	2269449
B	413m NW	Unspecified Wharf	1938	2284946
O	415m SE	Unspecified Tanks	1938	2198991
AI	415m SE	Tunnel	1938	2186953
AI	416m SE	Tunnel	1916	2214375
B	418m W	Unspecified Pit	1990	2244611
B	418m W	Unspecified Pit	1977	2244611
B	418m W	Unspecified Pit	1971	2244611
B	418m NW	Gas Works	1888	2275082
B	418m W	Unspecified Pit	1865	2126197
AI	420m SE	Tunnel	1938	2222826

ID	Location	Land Use	Date	Group ID
AI	421m SE	Tunnel	1932	2201075
O	421m SE	Unspecified Tank	1895	2155358
AI	422m SE	Tunnel	1946	2222826
B	422m NW	Gas Works	1898	2197699
B	422m NW	Gas Works	1898	2197699
AL	423m S	Cuttings	1895	2225362
AL	426m S	Cuttings	1916	2238478
AL	427m S	Cuttings	1898	2256878
AL	427m S	Cuttings	1898	2287436
B	427m W	Unspecified Works	1955	2181006
B	427m W	Unspecified Pit	1955	2220863
B	427m W	Cement Works	1966	2191753
AL	427m S	Cuttings	1888	2173593
B	428m NW	Gas Works	1865	2196446
AL	428m S	Cuttings	1865	2173593
AI	428m SE	Tunnel	1923	2214375
AL	428m S	Cuttings	1946	2182780
AL	428m S	Cuttings	1932	2182780
AL	428m S	Cuttings	1907	2182780
AL	428m S	Cuttings	1895	2265791
AL	428m S	Cuttings	1938	2177141
B	428m W	Unspecified Ground Workings	1907	2201701
AL	428m S	Cuttings	1955	2177141
AL	428m S	Cuttings	1990	2177141
AL	428m S	Cuttings	1977	2177141
AL	428m S	Cuttings	1971	2177141
B	429m NW	Unspecified Pit	1955	2126198
B	429m W	Brick Field	1865	2146742

ID	Location	Land Use	Date	Group ID
AI	429m SE	Tunnel	1907	2221121
AJ	430m SE	Unspecified Workings	1977	2151480
B	430m NW	Gasometers	1888	2219354
B	431m NW	Gasometer	1907	2267711
B	431m NW	Gasometer	1895	2251285
AB	431m E	Unspecified Wharf	1932	2240138
AI	432m SE	Unspecified Quarry	1865	2145147
AO	432m SW	Chalk Pit	1932	2221295
B	433m NW	Unspecified Tank	1971	2245813
AO	434m SW	Chalk Pit	1938	2221295
B	435m NW	Gasometers	1898	2246274
B	435m NW	Gasometers	1898	2246274
B	435m NW	Unspecified Tank	1966	2245813
B	436m NW	Gasometer	1923	2198636
B	436m NW	Unspecified Tank	1907	2189915
B	436m NW	Unspecified Tank	1895	2178668
B	436m NW	Unspecified Tanks	1932	2295240
AM	437m E	Engineering Works	1946	2142111
AP	437m SW	Cuttings	1888	2238616
AI	437m SE	Railway Sidings	1895	2236870
B	437m NW	Unspecified Tanks	1946	2289538
AL	437m S	Cuttings	1923	2177141
AP	438m SW	Cuttings	1895	2275660
AP	439m SW	Cuttings	1946	2188749
B	439m W	Unspecified Tank	1888	2221871
B	440m W	Unspecified Tank	1932	2173552
B	440m W	Unspecified Tank	1907	2223911
B	440m W	Unspecified Tank	1895	2281766

ID	Location	Land Use	Date	Group ID
B	440m W	Unspecified Tank	1923	2236118
AP	440m SW	Cuttings	1932	2193908
AQ	440m SE	Tramway Sidings	1946	2204626
B	441m NW	Gasometers	1916	2201676
AI	441m SE	Railway Sidings	1865	2170158
B	441m NW	Unspecified Tank	1923	2249129
B	441m W	Unspecified Ground Workings	1865	2231370
B	441m NW	Gasometer	1895	2210501
AP	444m SW	Cuttings	1895	2268145
B	444m NW	Gasometer	1865	2251285
B	444m W	Unspecified Tank	1898	2182614
B	444m W	Unspecified Tank	1898	2182614
B	444m W	Unspecified Tank	1946	2206358
AD	445m W	Unspecified Pit	1865	2212720
AQ	446m SE	Tramway Sidings	1938	2243934
B	447m W	Unspecified Tank	1938	2206358
B	447m NW	Gasometer	1895	2222190
B	448m W	Unspecified Tank	1938	2206358
AF	448m SE	Railway Sidings	1907	2276868
AI	449m SE	Unspecified Pits	1955	2141813
AN	450m S	Chalk Pit	1932	2222966
B	450m W	Unspecified Tanks	1895	2176477
B	451m W	Unspecified Tank	1865	2155362
O	452m SE	Unspecified Tanks	1932	2284856
B	452m NW	Unspecified Industrial/Commercial	1888	2164943
O	453m SE	Unspecified Tanks	1938	2280916
AN	453m S	Chalk Pit	1938	2222966
AF	453m SE	Railway Sidings	1923	2255519

ID	Location	Land Use	Date	Group ID
AR	454m NE	Railway Sidings	1955	2267789
AR	454m NE	Railway Sidings	1966	2267789
AS	455m NE	Railway Sidings	1982	2257573
AS	455m NE	Railway Sidings	1992	2257573
AN	455m S	Refuse Heap	1946	2246271
AK	457m S	Tunnel	1946	2151572
B	457m W	Unspecified Pit	1895	2169819
B	459m W	Unspecified Tanks	1888	2194428
B	459m W	Unspecified Tanks	1895	2192420
AT	461m S	Tramway Sidings	1946	2151152
AT	461m S	Chalk Pit	1946	2294193
AT	461m S	Gravel Pit	1977	2139097
B	462m W	Unspecified Tanks	1990	2255661
B	462m W	Unspecified Tanks	1977	2259554
B	462m W	Unspecified Tanks	1971	2226113
B	463m W	Unspecified Tanks	1898	2201962
B	463m W	Unspecified Tanks	1898	2236772
B	465m NW	Railway Sidings	1865	2222502
O	466m SE	Unspecified Ground Workings	1955	2134364
AK	466m S	Pump House	1990	2168094
B	468m W	Railway Sidings	1907	2252281
B	468m W	Railway Sidings	1895	2251914
AU	469m SW	Railway Sidings	1990	2188509
AU	469m SW	Railway Sidings	1977	2188509
AK	469m S	Pumping House	1946	2165293
B	470m W	Railway Sidings	1888	2192901
AT	470m S	Unspecified Ground Workings	1955	2227645
AT	470m S	Unspecified Ground Workings	1966	2227645

ID	Location	Land Use	Date	Group ID
9	470m N	Railway Sidings	1946	2249066
AI	471m SE	Tunnel	1938	2183707
B	472m W	Tunnel	1923	2259105
AV	472m E	Tyre Works	1932	2182901
AL	472m S	Chalk Pit	1932	2281142
AW	473m E	Electric Cable Works	1938	2176153
AL	473m S	Chalk Pit	1938	2281142
AW	473m E	Electric Cable Works	1916	2233623
AW	473m E	Printing Works	1938	2221904
AE	473m NW	Unspecified Wharf	1938	2178135
AE	473m NW	Unspecified Wharf	1938	2178135
AV	474m E	Tyre Works	1946	2291549
10	474m SW	Pump House	1990	2168095
AV	474m E	Unspecified Pit	1916	2238306
AE	475m NW	Unspecified Wharf	1932	2233903
AG	476m E	Unspecified Heap	1865	2137199
B	476m NW	Unspecified Tanks	1888	2175225
B	476m W	Railway Sidings	1898	2264451
B	476m W	Railway Sidings	1898	2214748
AV	476m E	Unspecified Works	1955	2160150
B	477m NW	Unspecified Tanks	1895	2211867
B	478m W	Unspecified Tanks	1888	2199678
AU	478m SW	Old Chalk Pit	1946	2165646
AW	478m E	Electric Cable Works	1907	2241347
AV	479m E	Unspecified Pit	1907	2249288
B	479m W	Unspecified Tanks	1895	2216730
B	480m NW	Unspecified Tanks	1923	2283061
B	480m NW	Tramway Sidings	1946	2268642

ID	Location	Land Use	Date	Group ID
B	480m NW	Cement Works	1895	2190489
AW	480m E	Electric Cable Works	1923	2195494
B	480m W	Railway Sidings	1923	2291062
AN	481m S	Refuse Heap	1966	2200866
AV	481m E	Unspecified Pit	1923	2238306
B	481m NW	Unspecified Tanks	1898	2188352
B	481m NW	Unspecified Tanks	1898	2182105
B	481m W	Tunnel	1946	2223839
B	481m W	Unspecified Tanks	1923	2228776
AX	482m S	Cuttings	1938	2179832
B	482m NW	Unspecified Tanks	1907	2228774
B	482m W	Tunnel	1938	2246210
B	483m W	Tunnel	1932	2223839
B	483m W	Tunnel	1907	2258760
B	483m NW	Unspecified Tank	1938	2155383
B	483m W	Unspecified Tanks	1898	2216730
B	483m W	Unspecified Tanks	1898	2216730
B	484m W	Unspecified Tanks	1907	2254171
B	484m NW	Unspecified Tanks	1938	2206761
B	484m NW	Tanks	1916	2162275
B	485m W	Railway Sidings	1895	2203719
B	485m NW	Unspecified Tanks	1923	2221188
AU	486m SW	Unspecified Pit	1966	2126196
AY	486m E	Engineering Works	1932	2262564
AZ	487m NW	Cement Works	1898	2205395
AZ	487m NW	Cement Works	1898	2205395
B	487m NW	Unspecified Tanks	1907	2172383
B	487m W	Tunnel	1938	2224324

ID	Location	Land Use	Date	Group ID
B	487m W	Tunnel	1916	2258760
B	487m W	Tunnel	1938	2223839
AX	487m S	Cuttings	1938	2217009
AY	487m E	Engineering Works	1938	2262564
AX	488m S	Cuttings	1898	2294425
AX	488m S	Cuttings	1898	2294425
B	489m NW	Unspecified Tank	1938	2155381
B	489m W	Unspecified Tank	1938	2155363
B	490m NW	Unspecified Tanks	1938	2209059
B	490m NW	Unspecified Tank	1938	2155382
B	490m W	Unspecified Tanks	1938	2277130
B	490m W	Tanks	1916	2162288
B	490m NW	Tanks	1916	2162273
B	494m W	Unspecified Quarry	1865	2145149
B	496m W	Unspecified Ground Workings	1923	2282743
B	497m W	Unspecified Tank	1938	2155364
B	497m NW	Unspecified Tank	1938	2155379
AU	498m SW	Unspecified Ground Workings	1955	2134374

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**140**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Tank**	**1898**	**369226**
A	**On site**	**Unspecified Tank**	**1897**	**391166**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Tank**	**1909**	**369227**
A	**On site**	**Unspecified Tank**	**1909**	**391166**
C	**On site**	**Tanks**	**1960**	**382860**
C	**On site**	**Tanks**	**1972**	**382860**
C	**On site**	**Tanks**	**1964**	**382860**
C	**On site**	**Tanks**	**1985**	**382860**
C	**On site**	**Tanks**	**1985**	**378147**
C	**On site**	**Unspecified Tank**	**1985**	**369190**
G	**On site**	**Unspecified Tank**	**1959**	**381832**
G	**On site**	**Tanks**	**1993**	**378184**
G	**On site**	**Tanks**	**1993**	**378185**
G	**On site**	**Unspecified Tank**	**1993**	**369230**
G	**On site**	**Tanks**	**1993**	**378183**
G	**On site**	**Unspecified Tank**	**1973**	**369229**
G	**On site**	**Unspecified Tank**	**1973**	**381832**
G	**On site**	**Unspecified Tank**	**1964**	**407667**
I	**On site**	**Unspecified Tank**	**1993**	**369228**
3	0m SW	Tanks	1993	378153
C	69m NE	Unspecified Tank	1952	387528
C	69m NE	Unspecified Tank	1952	387528
B	78m NW	Tanks	1897	406759
B	82m NW	Unspecified Tank	1952	403906
B	82m NW	Tanks	1898	406759
B	83m NW	Unspecified Tank	1952	385078
B	84m NW	Unspecified Tank	1933	405527
B	84m NW	Unspecified Tank	1939	405527
C	88m NE	Unspecified Tank	1952	397618
C	88m NE	Unspecified Tank	1972	369196

ID	Location	Land Use	Date	Group ID
C	89m NE	Unspecified Tank	1952	397618
B	90m NW	Unspecified Tank	1952	385078
U	98m S	Unspecified Tank	1865	369231
P	107m SW	Unspecified Tank	1980	409391
P	108m SW	Unspecified Tank	1994	409391
B	112m NW	Unspecified Tank	1897	369195
B	116m NW	Unspecified Tank	1898	369194
C	125m E	Unspecified Tank	1973	369197
B	147m NW	Unspecified Tank	1972	369191
B	163m W	Tanks	1980	386124
B	164m W	Tanks	1994	386124
B	168m NW	Unspecified Tank	1972	369192
B	175m NW	Unspecified Tank	1897	410620
B	175m NW	Unspecified Tank	1909	410620
O	205m E	Unspecified Tank	1952	384244
O	205m E	Unspecified Tank	1952	384244
B	227m NW	Tanks	1898	380616
B	229m NW	Tanks	1909	380616
B	231m NW	Tanks	1898	380616
B	242m NW	Tanks	1972	409855
B	244m NW	Tanks	1972	378197
B	247m NW	Tanks	1972	378196
Y	256m E	Unspecified Tank	1985	369189
B	277m NW	Tanks	1898	409855
Y	291m E	Unspecified Tank	1909	396103
Y	298m E	Unspecified Tank	1933	394287
Y	298m E	Unspecified Tank	1939	394287
O	303m E	Tanks	1985	402860

ID	Location	Land Use	Date	Group ID
O	303m E	Tanks	1993	402860
O	303m E	Tanks	1975	402860
O	309m E	Unspecified Tank	1975	409783
O	310m E	Unspecified Tank	1985	409783
AA	317m W	Unspecified Tank	1980	400171
Y	318m E	Unspecified Tank	1909	369180
AA	319m W	Unspecified Tank	1994	400171
B	323m W	Unspecified Tank	1980	385259
B	325m W	Unspecified Tank	1994	385259
O	330m SE	Unspecified Tank	1975	401329
O	330m SE	Unspecified Tank	1985	401329
Y	339m E	Unspecified Tank	1909	381436
Y	339m E	Unspecified Tank	1939	381436
Y	342m E	Tanks	1933	378148
B	349m NW	Unspecified Tank	1952	369193
AA	351m W	Unspecified Tank	1909	383759
Y	352m E	Unspecified Tank	1952	369182
AA	353m W	Unspecified Tank	1865	383759
B	354m NW	Unspecified Tank	1952	383793
B	354m NW	Unspecified Tank	1964	383793
AD	363m W	Unspecified Tank	1865	369225
O	372m E	Unspecified Tank	1909	369179
V	376m SW	Unspecified Tank	1897	369233
B	386m NW	Unspecified Tank	1952	397186
B	390m NW	Unspecified Tank	1898	401939
B	390m NW	Unspecified Tank	1932	401939
B	392m NW	Unspecified Tank	1909	405569
B	392m NW	Unspecified Tank	1939	405569

ID	Location	Land Use	Date	Group ID
B	392m NW	Unspecified Tank	1898	405569
B	394m W	Unspecified Tank	1972	369198
B	396m NW	Gas Works	1898	409673
O	398m SE	Unspecified Tank	1985	381398
O	399m SE	Unspecified Tank	1975	386616
AD	412m W	Unspecified Tank	1980	405159
AD	413m W	Unspecified Tank	1994	392725
AD	414m W	Unspecified Tank	1972	405159
AD	414m W	Unspecified Tank	1938	385333
AD	414m W	Unspecified Tank	1932	385333
O	418m SE	Unspecified Tank	1933	393294
O	419m SE	Unspecified Tank	1897	409453
B	428m NW	Gas Works	1909	401381
O	428m SE	Tanks	1933	378154
B	428m NW	Gas Works	1898	401381
B	433m NW	Unspecified Tank	1952	384701
B	433m NW	Unspecified Tank	1964	384701
B	433m NW	Unspecified Tank	1952	395028
B	438m NW	Gasometers	1898	391499
B	438m NW	Gasometers	1909	391499
B	438m NW	Gasometers	1939	391499
B	438m NW	Tanks	1932	378198
B	440m NW	Gasometer	1898	374083
B	443m W	Gasometer	1897	400746
B	443m W	Unspecified Tank	1909	394403
B	443m W	Unspecified Tank	1938	394403
B	443m W	Unspecified Tank	1932	394403
B	445m NW	Gasometer	1898	374084

ID	Location	Land Use	Date	Group ID
B	448m W	Gasometer	1898	400746
AD	449m W	Tanks	1970	394401
AD	449m W	Tanks	1979	403371
AD	449m W	Tanks	1986	403371
AD	454m W	Unspecified Tank	1865	369224
B	462m W	Tanks	1897	381405
B	462m W	Tanks	1909	381405
B	462m W	Unspecified Tank	1972	369200
B	466m W	Tanks	1898	388736
B	468m NW	Unspecified Tank	1952	385464
B	468m NW	Unspecified Tank	1964	385464
B	468m NW	Unspecified Tank	1952	402135
AK	470m S	Unspecified Tank	1952	407279
AK	470m S	Unspecified Tank	1952	407279
B	476m NW	Unspecified Tank	1972	369199
B	480m NW	Unspecified Tanks	1907	379245
B	481m NW	Tanks	1897	410197
B	481m NW	Tanks	1909	381354
B	482m W	Tanks	1897	400621
B	482m W	Tanks	1909	400621
B	485m NW	Tanks	1898	398666
B	487m W	Tanks	1898	404619
B	488m NW	Unspecified Tanks	1907	379246
B	490m NW	Tanks	1897	410197
AV	495m E	Unspecified Tank	1933	369181
AS	498m NE	Unspecified Tank	1950	368818

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	87

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 45 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Electricity Substation**	**1993**	**261926**
A	**On site**	**Electricity Substation**	**1973**	**261926**
4	35m S	Electricity Substation	1952	248018
C	54m E	Electricity Substation	1952	287687
C	54m E	Electricity Substation	1952	287687
R	82m W	Electricity Transformers	1980	283608
R	83m W	Electricity Transformers	1972	283608
R	87m W	Electricity Substation	1994	248020
U	96m S	Electricity Substation	1993	248010
U	98m S	Electricity Transformer	1972	250859
B	102m NW	Electricity Transformers	1972	251667
B	103m NW	Electricity Transformer	1972	250878
B	108m NW	Electricity Substation	1985	248027
B	115m W	Electricity Transformer	1980	255836
B	116m W	Electricity Transformer	1972	252333
B	119m W	Electricity Transformer	1980	267602
B	120m W	Electricity Substation	1952	273473
B	120m W	Electricity Substation	1964	273473
B	120m W	Electricity Transformer	1972	255204
B	120m W	Electricity Substation	1952	273473
B	121m W	Electricity Substation	1994	273473
B	137m W	Electricity Transformers	1980	264662
B	138m W	Electricity Transformers	1972	264662

ID	Location	Land Use	Date	Group ID
B	138m W	Electricity Substation	1994	248024
B	161m NW	Electricity Transformers	1972	251666
B	163m W	Electricity Transformers	1980	263528
B	164m W	Electricity Transformers	1972	263528
B	164m W	Electricity Substation	1994	248025
B	174m W	Electricity Transformers	1980	273832
B	175m W	Electricity Transformers	1972	273832
B	190m W	Electricity Transformers	1980	255837
B	191m W	Electricity Transformers	1972	253897
B	199m W	Electricity Transformers	1980	265199
B	201m W	Electricity Transformers	1972	265199
B	201m W	Electricity Substation	1994	248028
B	207m W	Electricity Transformers	1980	253630
B	208m W	Electricity Transformers	1972	255203
B	209m W	Electricity Substation	1994	248015
B	210m W	Electricity Transformers	1980	282969
B	211m W	Electricity Transformers	1972	282969
B	222m W	Electricity Transformers	1980	291870
Y	222m E	Power Station	1985	270815
B	223m W	Electricity Transformers	1972	254350
Y	223m E	Power Station	1993	270815
Y	223m E	Power Station	1975	260218
B	231m W	Electricity Substation	1994	248022
B	233m W	Electricity Transformers	1980	291870
B	234m W	Electricity Transformers	1972	253054
B	236m W	Electricity Transformers	1980	283875
B	237m W	Electricity Substation	1994	248030
B	237m W	Electricity Transformers	1972	283875

ID	Location	Land Use	Date	Group ID
B	247m W	Electricity Transformer	1980	268682
B	248m W	Electricity Transformer	1972	268682
B	259m W	Electricity Transformer	1980	272753
B	260m W	Electricity Transformer	1972	272753
B	261m W	Electricity Substation	1994	248021
Y	279m E	Electricity Substation	1952	288232
Y	279m E	Electricity Substation	1952	288232
O	299m SE	Electricity Substation	1993	266845
O	299m SE	Electricity Transformers	1975	251668
O	300m SE	Electricity Substation	1985	266845
B	329m W	Electricity Transformers	1980	251665
B	329m W	Electricity Transformer	1972	250880
B	330m W	Electricity Transformers	1972	251664
AC	367m S	Electricity Transformer	1972	250860
AH	383m SW	Electricity Transformer	1980	268840
AH	385m SW	Electricity Substation	1994	248016
AH	385m SW	Electricity Transformer	1972	268840
B	396m NW	Gas Works	1898	260678
AM	409m E	Electricity Transformer	1975	250884
B	410m NW	Disused Gas Works	1939	251267
AM	427m E	Electricity Substation	1985	267760
B	428m NW	Gas Works	1909	262911
B	428m NW	Gas Works	1898	262911
AM	429m E	Electricity Substation	1995	275831
AM	429m E	Electricity Substation	1993	275831
B	438m NW	Gasometers	1898	279285
B	438m NW	Gasometers	1909	279285
B	438m NW	Gasometers	1939	279285

ID	Location	Land Use	Date	Group ID
B	439m NW	Gasometer	1898	251565
B	443m W	Gasometer	1897	288350
B	445m NW	Gasometer	1898	251566
T	445m SW	Electricity Substation	1972	248009
B	448m W	Gasometer	1898	288350
8	459m S	Electricity Transformer	1972	250858
AK	467m S	Electricity Transformer	1972	250856
AK	474m S	Electricity Transformer	1972	250857

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	**10**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

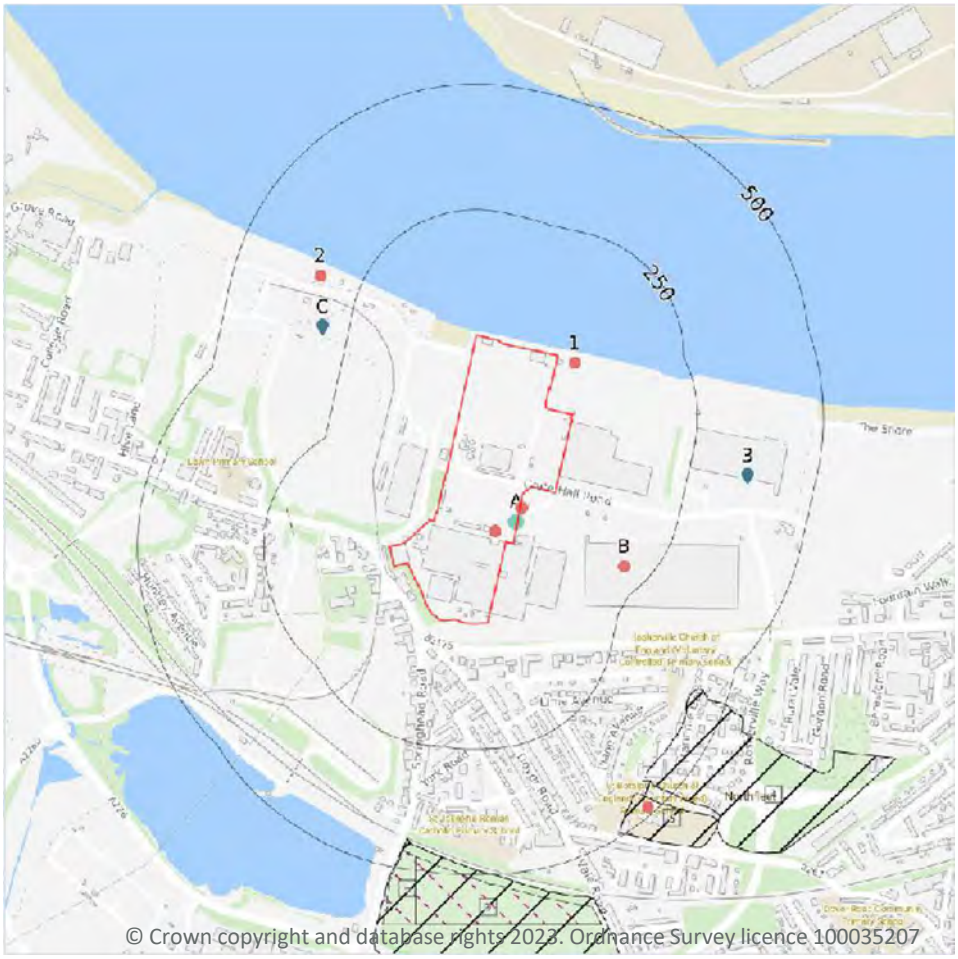
Features are displayed on the Past land use - un-grouped map on **page 45 >**

ID	Location	Land Use	Date	Group ID
L	37m E	Garage	1952	84956
L	37m E	Garage	1952	84956
N	61m SW	Garage	1952	80086
N	61m SW	Garage	1952	80086
N	61m SW	Garage	1964	80086

ID	Location	Land Use	Date	Group ID
AC	346m S	Garage	1952	85649
AC	346m S	Garage	1952	85649
AN	421m S	Garage	1952	76809
AN	422m S	Garage	1972	75549
AN	422m S	Garage	1952	78122

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Historical landfill (EA/NRW)

Historical landfill (BGS)

Historical landfill (LA/OS)

Licensed waste sites

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	1

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

Features are displayed on the Waste and landfill map on **page 87 >**

ID	Location	Address	BGS Number	Risk	Waste Type
A	**On site**	**Northfleet Power stn, Crete Hall Rd, Northfleet,Kt**	**1947**	**Risk to major aquifer**	**N/A**

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	**2**

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 87 >**

ID	Location	Site address	Source	Data type
6	465m S	Refuse Tip	1971 mapping	Polygon
D	473m S	Refuse Tip	1971 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	**3**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 87 >**

ID	Location	Details		
4	426m SE	Site Address: Northfleet Power Station, Northfleet, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: 21EL, P/02/02 Waste Type: Inert, Industrial, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 14/05/1977 Licence Surrender: 31/12/1992	Operator: Central Electricity Generating Board Licence Holder: Central Electricity Generating Board First Recorded 31/12/1960 Last Recorded: 31/12/1992

ID	Location	Details		
D	440m S	Site Address: Springhead Road, Swale, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: REIN.2/1, 21BF Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 01/01/1976 Licence Surrender: -	Operator: Northfleet Urban District Council Licence Holder: Kent County Council First Recorded 31/12/1951 Last Recorded: 31/12/1984
5	448m SE	Site Address: Northfleet Power Station, Northfleet, Kent Licence Holder Address: -	Waste Licence: Yes Site Reference: 21EL, P/02/02 Waste Type: Inert, Industrial, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 14/05/1977 Licence Surrender: 31/12/1992	Operator: - Licence Holder: Central Electricity Generating Board First Recorded 31/12/1960 Last Recorded: 31/12/1992

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	5

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 87 >**

ID	Location	Details		
C	302m NW	Site Name: Northfleet Temporary Inert Waste Transfer Facility Site Address: Northfleet Works, Northfleet Embankment, Gravesend, Kent, DA11 9AN Correspondence Address: -	Type of Site: Transfer Station taking Non-Biodegradable Wastes Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/S004 Operator: B A M Nuttal Ltd, Ferrovial Agroman (U K) Ltd, Kier Infrastructure & Overseas Waste Management licence No: 102226 Annual Tonnage: 0	Issue Date: 24/04/2012 Effective Date: - Modified: 07/05/2013 Surrendered Date: 09/10/2015 Expiry Date: - Cancelled Date: - Status: Surrendered
C	302m NW	Site Name: Northfleet Temporary Inert Waste Transfer Facility Site Address: Northfleet Works, Northfleet Embankment, Gravesham, Kent, DA1 9AN Correspondence Address: -	Type of Site: Transfer Station taking Non-Biodegradable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/V002 Operator: Bam Ferrovial Kier Joint Venture Waste Management licence No: 102226 Annual Tonnage: 700000	Issue Date: 24/04/2012 Effective Date: - Modified: 11/03/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
C	302m NW	Site Name: Northfleet Temporary Inert Waste Transfer Facility Site Address: Northfleet Works, Northfleet Embankment, Gravesham, Kent, DA11 9AN Correspondence Address: -	Type of Site: Transfer Station taking Non-Biodegradable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/V003 Operator: Bam Nuttal Ltd, Ferrovial Agroman (U K) Ltd, Kier Infrastructure & Overseas Ltd Waste Management licence No: 102226 Annual Tonnage: 1200000	Issue Date: 24/04/2012 Effective Date: - Modified: 07/05/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

ID	Location	Details		
C	302m NW	Site Name: Northfleet Temporary Inert Waste Transfer Facility Site Address: Northfleet Works, Northfleet Embankment, Gravesend, Kent, DA11 9AN Correspondence Address: -	Type of Site: Transfer Station taking Non-Biodegradable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CRO117 EPR reference: EA/EPR/RP3194EY/S004 Operator: B A M Nuttal Ltd, Ferrovial Agroman (U K) Ltd, Kier Infrastructure & Overseas Waste Management licence No: 102226 Annual Tonnage: 0	Issue Date: 24/04/2012 Effective Date: - Modified: 07/05/2013 Surrendered Date: Oct 9 2015 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered
3	365m E	Site Name: Red Lion Wharf Site Address: Red Lion Wharf, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AA Correspondence Address: -	Type of Site: Treatment of waste wood 75000 tps Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HWR004 EPR reference: EA/EPR/GB3538AC/S002 Operator: Hadfield Wood Recyclers Limited Waste Management licence No: 104141 Annual Tonnage: 0	Issue Date: 23/05/2012 Effective Date: - Modified: - Surrendered Date: 28/04/2014 Expiry Date: - Cancelled Date: - Status: Surrendered

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m **17**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 87 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	**On site**	**-**	**WEX261186**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in secure containers**
A	2m SE	Kimberly Clark Cretehall Road Kent DA11 9AD	EPR/SF0808MD/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers

ID	Location	Site	Reference	Category	Sub-Category	Description
A	3m SE	Northfleet Mill Crete Hall Road GRAVESEND Kent DA11 9AD	EPR/JH0214AK/A001	Using waste exemption	Non-Agricultural Waste Only	Use of sludge for the purposes of re-seeding a waste water treatment plant
A	3m SE	kimberly clark, cretehall road, northfleet, kent, DA11 9AD	WEX120709	Storing waste exemption	Not on a farm	Storage of waste in secure containers
1	35m NE	-	WEX163596	Using waste exemption	Not on a Farm	Use of waste in construction
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX239725	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX239725	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX239725	Treating waste exemption	Not on a farm	Treatment of waste food
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX239725	Treating waste exemption	Not on a farm	Crushing waste fluorescent tubes
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX282639	Treating waste exemption	Not on a farm	Sorting mixed waste
B	200m SE	CRETE HALL ROAD, NORTHFLEET, GRAVESEND, DA11 9BU	WEX144201	Treating waste exemption	Not on a farm	Sorting mixed waste
B	200m SE	19, WORPLE ROAD, LONDON, SW19 4JS	WEX096851	Treating waste exemption	Not on a farm	Treatment of waste food
B	200m SE	19, WORPLE ROAD, LONDON, SW19 4JS	WEX096851	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	200m SE	19, WORPLE ROAD, LONDON, SW19 4JS	WEX096851	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	200m SE	19, WORPLE ROAD, LONDON, SW19 4JS	WEX096851	Treating waste exemption	Not on a farm	Crushing waste fluorescent tubes
2	333m NW	Tarmac Cement and Lime Ltd, The Shore, Northfleet, Gravesend, DA11 9AN	WEX259657	Using waste exemption	Not on a farm	Use of waste in construction

ID	Location	Site	Reference	Category	Sub-Category	Description
7	485m SE	St Botolphs Primary School Dover Road GRAVESEND Kent DA11 9PL	EPR/DE5089FR /A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use

Site Outline

Search buffers in metres (m)

- Recent industrial land uses
- Electricity cables
- Hazardous substance storage/usage
- Historical licensed industrial activities
- Part A(1) industrial activities
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- List 1 Dangerous Substances
- List 2 Dangerous Substances
- Pollution Incidents (EA/NRW)
- Pollution inventory substances
- Pollution inventory waste transfers

4.1 Recent industrial land uses

Records within 250m	37

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on page 94 >

ID	Location	Company	Address	Activity	Category
1	On site	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
2	On site	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
A	On site	Artisan Engineering Ltd	Northfleet Mill, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AD	Industrial Engineers	Engineering Services

ID	Location	Company	Address	Activity	Category
B	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
B	**On site**	**Chimney**	**Kent, DA11**	**Chimneys**	**Industrial Features**
B	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
C	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
C	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
C	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
C	**On site**	**Tank**	**Kent, DA11**	**Tanks (Generic)**	**Industrial Features**
4	5m SW	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
5	38m NE	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities
F	42m N	Travelling Cranes	Kent, DA11	Travelling Cranes and Gantries	Industrial Features
6	43m SW	Whitecode Design Associates	26-27, The Hill, Northfleet, Gravesend, Kent, DA11 9EU	Electrical and Electronic Engineers	Engineering Services
G	63m E	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
G	69m E	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
H	73m S	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
8	77m SW	Dpf Specialist Northfleet	5, High Street, Northfleet, Gravesend, Kent, DA11 9EZ	Vehicle Repair, Testing and Servicing	Repair and Servicing
L	83m NE	Bowater's Wharf	Kent, DA11	Moorings and Unloading Facilities	Water
H	88m S	Highline Fabrications	3, Dover Road, Northfleet, Gravesend, Kent, DA11 9PH	Cutting, Drilling and Welding Services	Construction Services
L	96m NE	Travelling Crane	Kent, DA11	Travelling Cranes and Gantries	Industrial Features
H	102m S	Hire Station	5, Springhead Road, Northfleet, Gravesend, Kent, DA11 9QT	Construction and Tool Hire	Hire Services
I	118m N	Travelling Crane	Kent, DA11	Travelling Cranes and Gantries	Industrial Features

ID	Location	Company	Address	Activity	Category
M	125m W	Electricity Sub Station	Kent, DA11	Electrical Features	Infrastructure and Facilities
N	136m SW	Mast (Telecommunication)	Kent, DA11	Telecommunications Features	Infrastructure and Facilities
9	139m S	Discount Cars Ltd	29-31, Dover Road, Northfleet, Gravesend, Kent, DA11 9PH	Secondhand Vehicles	Motoring
N	141m SW	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities
M	169m W	Tank	Kent, DA11	Tanks (Generic)	Industrial Features
10	173m SW	Chalk Pit (Disused)	Kent, DA11	Stone Quarrying and Preparation	Extractive Industries
R	181m SW	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities
R	188m SW	Masts	Kent, DA11	Telecommunications Features	Infrastructure and Facilities
R	200m SW	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities
R	214m SW	Pylon	Kent, DA11	Electrical Features	Infrastructure and Facilities
11	244m SW	Chalk Pit (Disused)	Kent, DA11	Stone Quarrying and Preparation	Extractive Industries
12	246m S	Drysite Ltd	40, Springhead Road, Northfleet, Gravesend, Kent, DA11 9QY	Construction Completion Services	Construction Services
V	249m W	Can-do Tool Hire	11-15, High Street, Northfleet, Gravesend, Kent, DA11 9EZ	Construction and Tool Hire	Hire Services
V	249m W	Can-Do	11-15, High Street, Northfleet, Gravesend, Kent, DA11 9EZ	Construction and Tool Hire	Hire Services

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	34

High voltage underground electricity transmission cables.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Cable Set	Cable Route	Details	
D	10m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	11m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	11m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	12m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	12m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	13m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	13m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	14m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
D	14m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	81m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	82m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified

ID	Location	Cable Set	Cable Route	Details	
J	82m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	83m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	83m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	84m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	84m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	85m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
J	85m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified

ID	Location	Cable Set	Cable Route	Details	
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
S	186m S	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	273m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	273m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	274m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	274m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	275m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	275m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified
X	277m E	-	-	Cable Make: - Cable Type: PILOT Operating Voltage (kV): -	Year of installation: Not specified Cable in tunnel? Not specified

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	1

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Details	
3	**On site**	**Application reference number: No Details** **Application status: Historical Consent** **Application date: No Details** **Address: Ridgeway International, Cliffe Alpha Jetty, Gravesend, Kent, England**	**Details: No Details** **Enforcement: No Details** **Date of enforcement: No Details** **Comment: No Details**

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	2

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Details	
Q	207m E	Operator: Kimberly Clark Ltd Address: Northfleet Mill, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AD Process: Paper And Pulp Manufacturing Processes Permit Number: AU7117	Original Permit Number: IPCAPP Date Approved: 20-6-1996 Effective Date: 1-7-1996 Status: Superseded By Variation
Q	207m E	Operator: Kimberly Clark Ltd Address: Northfleet Mill, Crete Hall Road, Northfleet, Gravesend, Kent, DA11 9AD Process: Paper And Pulp Manufacturing Processes Permit Number: BD4376	Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked - Now Ippc

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	13

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Details	
A	**On site**	**Operator: Kimberly-Clark Limited** **Installation Name: Northfleet Mill EPR/BJ7379IZ** **Process: DISPOSAL OF > 50 T/D NON-HAZARDOUS WASTE (> 100 T/D IF ONLY AD) INVOLVING BIOLOGICAL TREATMENT** **Permit Number: QP3035AH** **Original Permit Number: BJ7379IZ**	**EPR Reference: -** **Issue Date: 16/06/2016** **Effective Date: 16/06/2016** **Last date noted as effective: 21/03/2023** **Status: Superceded**
A	**On site**	**Operator: Kimberly-Clark Limited** **Installation Name: Northfleet Mill EPR/BJ7379IZ** **Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D** **Permit Number: QP3035AH** **Original Permit Number: BJ7379IZ**	**EPR Reference: -** **Issue Date: 16/06/2016** **Effective Date: 16/06/2016** **Last date noted as effective: 21/03/2023** **Status: Superceded**

ID	Location	Details	
A	**On site**	**Operator: Kimberly-Clark Limited** **Installation Name: Northfleet Mill EPR/BJ7379IZ** **Process: COMBUSTION; ANY FUEL =>50MW** **Permit Number: QP3035AH** **Original Permit Number: BJ7379IZ**	**EPR Reference: -** **Issue Date: 16/06/2016** **Effective Date: 16/06/2016** **Last date noted as effective: 21/03/2023** **Status: Superceded**
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: NORTHFLEET TISSUE MILL Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: BJ7379IZ Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 25/04/2002 Effective Date: 25/04/2002 Last date noted as effective: 21/03/2023 Status: Superceded
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: NORTHFLEET TISSUE MILL Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: QP3431UX Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 08/01/2010 Effective Date: 08/01/2010 Last date noted as effective: 21/03/2023 Status: Superceded
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: Northfleet Paper Mill - EPR/BJ7379IZ Process: COMBUSTION; ANY FUEL =>50MW Permit Number: LP3608PF Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 10/11/2020 Effective Date: 10/11/2020 Last date noted as effective: 21/03/2023 Status: Effective
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: NORTHFLEET TISSUE MILL Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: ZP3437FC Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 08/05/2012 Effective Date: 08/05/2012 Last date noted as effective: 21/03/2023 Status: Superceded
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: Northfleet Mill Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: BP3734ZK Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 12/09/2013 Effective Date: 12/09/2013 Last date noted as effective: 21/03/2023 Status: Superceded
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: NORTHFLEET TISSUE MILL Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: AP3430FY Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 15/02/2012 Effective Date: 15/02/2012 Last date noted as effective: 21/03/2023 Status: Superceded

ID	Location	Details	
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: Northfleet Paper Mill - EPR/BJ7379IZ Process: DISPOSAL OF > 50 T/D NON-HAZARDOUS WASTE (> 100 T/D IF ONLY AD) INVOLVING BIOLOGICAL TREATMENT Permit Number: LP3608PF Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 10/11/2020 Effective Date: 10/11/2020 Last date noted as effective: 21/03/2023 Status: Effective
Q	199m E	Operator: Kimberly-Clark Limited Installation Name: Northfleet Paper Mill - EPR/BJ7379IZ Process: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: LP3608PF Original Permit Number: BJ7379IZ	EPR Reference: - Issue Date: 10/11/2020 Effective Date: 10/11/2020 Last date noted as effective: 21/03/2023 Status: Effective
Q	207m E	Operator: KIMBERLY CLARK LTD Installation Name: - Process: PAPER, PULP & BOARD; PRODUCING PAPER/BOARD >20T/D Permit Number: BJ7379 Original Permit Number: BJ7379	EPR Reference: - Issue Date: 25/04/2002 Effective Date: 25/04/2002 Last date noted as effective: 01/10/2004 Status: SUPERSEDED BY PAS
W	274m NW	Operator: Lafarge Cement Uk Plc Installation Name: Northfleet Cement Works Process: CEMENT AND LIME; PRODUCING ETC CEMENT CLINKER Permit Number: BM0176IS Original Permit Number: BM0176IS	EPR Reference: - Issue Date: 26/03/2004 Effective Date: 26/03/2004 Last date noted as effective: 21/03/2023 Status: Superceded

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m **2**

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Address	Details	
7	74m W	Tarmac Cement & Lime Ltd, The Shore, Northfleet, DA11 9AN	Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

ID	Location	Address	Details	
X	291m E	Stema, Crete Hall Road, Northfleet, Kent, DA11 9AD	Process: Quarry Processes Status: Surrendered Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	**0**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	**15**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Address	Details	
C	37m SW	TISSUE MILL, NORTHFLEET, KENT, TISSUE MILL, NORTHFLEET, KENT	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTMR.0185 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 26/06/1975 Effective Date: 14/06/1979 Revocation Date: 20/01/1992
C	37m SW	TISSUE MILL, NORTHFLEET, KENT, TISSUE MILL, NORTHFLEET, KENT	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTMR.0185 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 26/06/1975 Effective Date: 14/06/1979 Revocation Date: 20/01/1992
F	51m N	NORTHFLEET MILL, CRETE HALL ROAD, N, NORTHFLEET MILL, CRETE HALL ROAD, NORTHFLEET, KENT	Effluent Type: UNSPECIFIED Permit Number: CNTM.0004 Permit Version: 1 Receiving Water: RIVER THAMES	Status: REVOKED - UNSPECIFIED Issue date: 20/01/1992 Effective Date: 20/01/1992 Revocation Date: 08/07/1996
I	81m N	BLUE CIRCLE CEMENT WORKS, THE SHORE, BLUE CIRCLE CEMENT WORKS, THE SH, ORE, NORTHFLEET, GRAVESEND, KENT	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: CTCR.2043 Permit Version: 1 Receiving Water: TIDAL THAMES	Status: REVOKED - UNSPECIFIED Issue date: 24/10/1983 Effective Date: 24/10/1983 Revocation Date: 23/08/1993

ID	Location	Address	Details	
P	166m NW	OUTLET A, BLUE CIRCLE, NORTHFLEET, OUTLET A, BLUE CIRCLE, NORTHFLEE, T, THE SHORE, NORTHFLEET, GRAVSE, ND, KENT	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: CNTM.1265 Permit Version: 2 Receiving Water: RIVER THAMES TIDAL	Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 09/12/2009 Effective Date: 09/12/2009 Revocation Date: -
P	166m NW	OUTLET A, BLUE CIRCLE, NORTHFLEET, OUTLET A, BLUE CIRCLE, NORTHFLEE, T, THE SHORE, NORTHFLEET, GRAVSE, ND, KENT	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: CNTM.1265 Permit Version: 1 Receiving Water: RIVER THAMES TIDAL	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 24/01/1994 Effective Date: 24/01/1994 Revocation Date: 09/12/2009
P	166m NW	NORTHFLEET WORKS, NORTHFLEET, KENT, NORTHFLEET WORKS, NORTHFLEET, KE, NT	Effluent Type: MISCELLANEOUS DISCHARGES - UNSPECIFIED Permit Number: CTCR.1895 Permit Version: 1 Receiving Water: THAMES (TIDAL)	Status: REVOKED - UNSPECIFIED Issue date: 21/09/1982 Effective Date: 21/09/1982 Revocation Date: 23/08/1993
T	201m NW	NORTHFLEET WORKS, NORTHFLEET, KENT, NORTHFLEET WORKS, NORTHFLEET, KE, NT	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: CTMR.0019 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 05/01/1978 Effective Date: 05/01/1978 Revocation Date: 23/08/1993
T	201m NW	NORTHFLEET WORKS, NORTHFLEET, KENT, NORTHFLEET WORKS, NORTHFLEET, KE, NT	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: CTMR.0358 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 05/01/1978 Effective Date: 05/01/1978 Revocation Date: 23/08/1993
W	256m NW	BLUE CIRCLE WASHING PLANT, A2 WATLING STREET, BEAN, DARTFORD, KENT, DA2 8AH	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: CASM.0640 Permit Version: 1 Receiving Water: THE TIDAL RIVER THAMES	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 08/08/2002 Effective Date: 24/07/2002 Revocation Date: -
W	264m NW	NORTHFLEET EASTERN QUARRY WWTW, WATLING STREET, BEAN, DARTFORD, DA2 8AH	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: EPRBB3093EY Permit Version: 1 Receiving Water: THAMES ESTUARY	Status: SURRENDERED UNDER EPR 2010 Issue date: 30/03/2015 Effective Date: 04/04/2016 Revocation Date: 20/04/2016
13	289m E	MAIN C W DISCHARGE, NORTHFLEET POWE, MAIN C W DISCHARGE, NORTHFLEET P, OWER STATION, KENT	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: CTMR.0112 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 02/05/1978 Effective Date: 02/05/1978 Revocation Date: 15/01/1992

ID	Location	Address	Details	
Y	389m E	NORTHFLEET POWER STATION, NORTHFLEE, NORTHFLEET POWER STATION, NORTHF, LEET, KENT	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: CTMR.0113 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 02/05/1978 Effective Date: 02/05/1978 Revocation Date: 15/01/1992
Y	389m E	NORTHFLEET POWER STATION, NORTHFLEE, NORTHFLEET POWER STATION, NORTHF, LEET, KENT	Effluent Type: MISCELLANEOUS DISCHARGES - UNSPECIFIED Permit Number: CTMR.0114 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 02/05/1978 Effective Date: 02/05/1978 Revocation Date: 15/01/1992
16	489m E	UPPER DISCHARGE, AEI CABLES LTD, GR, UPPER DISCHARGE, AEI CABLES LTD, GRAVESEND, KENT	Effluent Type: MISCELLANEOUS DISCHARGES - UNSPECIFIED Permit Number: CTMR.0118 Permit Version: 1 Receiving Water: THAMES	Status: REVOKED - UNSPECIFIED Issue date: 29/10/1979 Effective Date: 29/10/1979 Revocation Date: 09/03/1992

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	5

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Name	Status	Receiving Water	Authorised Substances
F	51m N	Kimberley Clark, Northfleet	Active	Thames Estuary	Mercury (other), Cadmium, Pentachlorophenol
O	142m NW	Blue Circle Cement Works	Active	-	-
O	142m NW	Blue Circle Cement Works	Active	-	-
O	142m NW	Blue Circle Cement Works (blue Circle Point A: Northfleet)	Not Active	Thames Estuary	Mercury (other), Cadmium
W	314m NW	Blue Circle Cement Works	Active	Thames Estuary	Cadmium

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	**1**

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Name	Status	Receiving Water	Authorised Substances
F	51m N	Kimberly Clark Ltd., Northfleet	Not Active	Thames Estuary	Atrazine & Simazine, Organotin

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	**16**

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 94 >**

ID	Location	Details	
C	**On site**	**Incident Date: 25/04/2003** **Incident Identification: 154082** **Pollutant: Contaminated Water** **Pollutant Description: Firefighting Run-Off**	**Water Impact: Category 3 (Minor)** **Land Impact: Category 3 (Minor)** **Air Impact: Category 3 (Minor)**

ID	Location	Details	
E	31m NE	Incident Date: 07/06/2006 Incident Identification: 405203 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other Animal Matter	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)
E	31m NE	Incident Date: 07/06/2006 Incident Identification: 405203 Pollutant: Inert Materials and Wastes Pollutant Description: Other Inert Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 2 (Significant)
K	82m NW	Incident Date: 26/03/2002 Incident Identification: 66640 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
K	82m NW	Incident Date: 26/11/2002 Incident Identification: 123239 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
Q	175m E	Incident Date: 24/06/2001 Incident Identification: 11177 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
Q	175m E	Incident Date: 24/06/2001 Incident Identification: 11177 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
U	214m NW	Incident Date: 18/03/2003 Incident Identification: 143836 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
U	215m NW	Incident Date: 21/02/2003 Incident Identification: 138463 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
U	216m NW	Incident Date: 08/04/2003 Incident Identification: 149537 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
U	217m NW	Incident Date: 13/03/2003 Incident Identification: 142774 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Location	Details	
U	217m NW	Incident Date: 17/02/2003 Incident Identification: 137435 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Soot/Smuts	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
V	243m W	Incident Date: 30/04/2004 Incident Identification: 233737 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)
W	274m NW	Incident Date: 05/03/2002 Incident Identification: 61964 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
14	417m SW	Incident Date: 04/05/2004 Incident Identification: 234253 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)
15	444m S	Incident Date: 09/03/2003 Incident Identification: 141950 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	**2**

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 94 >**

ID: Q, Location: 200m E, Permit: BJ7379IZ
Operator: Kimberly-Clark Limited
Activity: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D
Address: Northfleet Paper Mill Crete Hall Road Kent DA11 9AD
Sector: Paper and textiles, Sub-sector: Paper & Pulp
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Particulate matter - total	10000kg	Below Reporting Threshold

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Controlled Waters	Copper	20kg	Below Reporting Threshold
Controlled Waters	Lead	20kg	Below Reporting Threshold
Controlled Waters	Mercury	0.1kg	Below Reporting Threshold
Controlled Waters	Nickel	20kg	Below Reporting Threshold
Controlled Waters	Zinc	100kg	Below Reporting Threshold
Controlled Waters	Nonylphenols and nonylphenol ethoxylates	1kg	Below Reporting Threshold
Controlled Waters	Octylphenols and octylphenol ethoxylates	1kg	Below Reporting Threshold
Controlled Waters	Tributyltin and compounds - as TBT	0.005kg	Below Reporting Threshold
Controlled Waters	Cadmium	1kg	Below Reporting Threshold
Controlled Waters	Cypermethrin	0.005kg	Below Reporting Threshold
Air	Carbon monoxide	100000kg	Below Reporting Threshold
Air	Nitrogen oxides (NO and NO2) as NO2	100000kg	Below Reporting Threshold
Controlled Waters	Chlorpyrifos	0.1kg	Below Reporting Threshold
Air	Pentachlorophenol (PCP)	1kg	Below Reporting Threshold
Controlled Waters	Endosulfan	0.0005kg	Below Reporting Threshold
Controlled Waters	Halogenated organic compounds - as AOX	1000kg	Below Reporting Threshold
Controlled Waters	Nitrogen - as total N	50000kg	Below Reporting Threshold
Controlled Waters	Phosphorus - as total P	5000kg	Below Reporting Threshold

ID: Q, Location: 200m E, Permit: BJ7379IZ
Operator: Kimberly-Clark Limited
Activity: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D
Address: Northfleet Paper Mill Crete Hall Road Kent DA11 9AD
Sector: Paper and textiles, Sub-sector: Paper & Pulp
Releases:

Route	Substance	Reporting threshold (kg)	Quantity (kg)
Air	Carbon dioxide	10000000kg	22901400kg

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	1

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

Features are displayed on the Current industrial land use map on **page 94 >**

ID: Q, Location: 200m E, Permit: BJ7379IZ
Operator: Kimberly-Clark Limited
Activity: PAPER, PULP AND BOARD; PRODUCING PAPER/BOARD >20T/D
Address: Northfleet Paper Mill Crete Hall Road Kent DA11 9AD
Sector: Paper and textiles, Sub-sector: Paper & Pulp
Releases:

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	17.66	absolute value	15 01 02	plastic packaging	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	-	brt	15 01 04	metallic packaging	No
R4	Recycling/reclamation of metals and metal compounds	575.3	absolute value	20 01 40	metals	No
R4	Recycling/reclamation of metals and metal compounds	41.82	absolute value	17 04 01	copper, bronze, brass	No
R4	Recycling/reclamation of metals and metal compounds	23	absolute value	17 04 11	cables other than those mentioned in 17 04 10	No
R4	Recycling/reclamation of metals and metal compounds	52.8	absolute value	19 12 03	non-ferrous metal	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	-	brt	15 01 06	mixed packaging	No

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R1	Use principally as a fuel or other means to generate energy	11.66	absolute value	17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	-	brt	11 01 14	degreasing wastes other than those mentioned in 11 01 13	No
R1	Use principally as a fuel or other means to generate energy	267.834	absolute value	20 03 01	mixed municipal waste	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	148.02	absolute value	15 01 01	paper and cardboard packaging	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	65.08	absolute value	15 01 03	wooden packaging	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	1286.12	absolute value	03 03 10	fibre rejects, fibre-, filler- and coating-sludges from mechanical separation	No
R1	Use principally as a fuel or other means to generate energy	90.5	absolute value	03 03 10	fibre rejects, fibre-, filler- and coating-sludges from mechanical separation	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	110.9	absolute value	17 01 01	concrete	No
R3	Recycling/Reclamation of organic substances which are not used as solvents (including composting and other biological transformatin processes)	13.42	absolute value	17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	No
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	17	absolute value	08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09	No

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	34.395	absolute value	16 05 09	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	-	brt	20 01 34	batteries and accumulators other than those mentioned in 20 01 33	No
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	-	brt	20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	No
R4	Recycling/reclamation of metals and metal compounds	3.72	absolute value	20 01 35	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (6)	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.4	absolute value	08 04 09	waste adhesives and sealants containing organic solvents or other dangerous substances	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.34	absolute value	08 03 17	waste printing toner containing dangerous substances	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	1.23	absolute value	13 02 05	mineral-based non-chlorinated engine, gear and lubricating oils	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	2.826	absolute value	15 01 10	packaging containing residues of or contaminated by dangerous substances	Yes

Route	Route description	Quantity (tonnes)	Release level	EWC code	EWC description	Hazardous waste
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	8.17	absolute value	15 01 10	packaging containing residues of or contaminated by dangerous substances	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	0.56	absolute value	15 02 02	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	0.205	absolute value	16 04 03	other waste explosives	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	0.47	absolute value	16 05 04	gases in pressure containers (including halons) containing dangerous substances	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	6.705	absolute value	16 05 06	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.1	absolute value	16 06 01	lead batteries	Yes
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	0.4	absolute value	20 01 33	batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	Yes
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage pending collection, on the site where it is produced)	0.3	absolute value	08 01 11	waste paint and varnish containing organic solvents or other dangerous substances	Yes

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

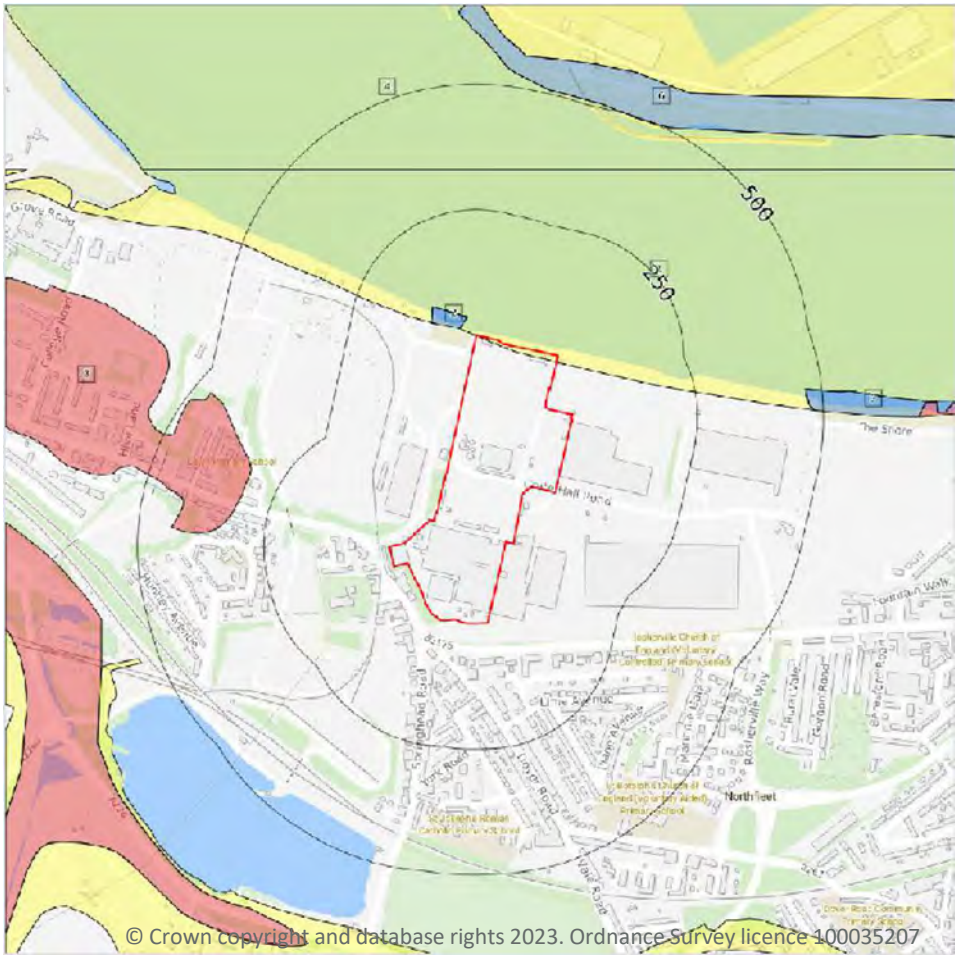
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m	6

Aquifer status of groundwater held within superficial geology.

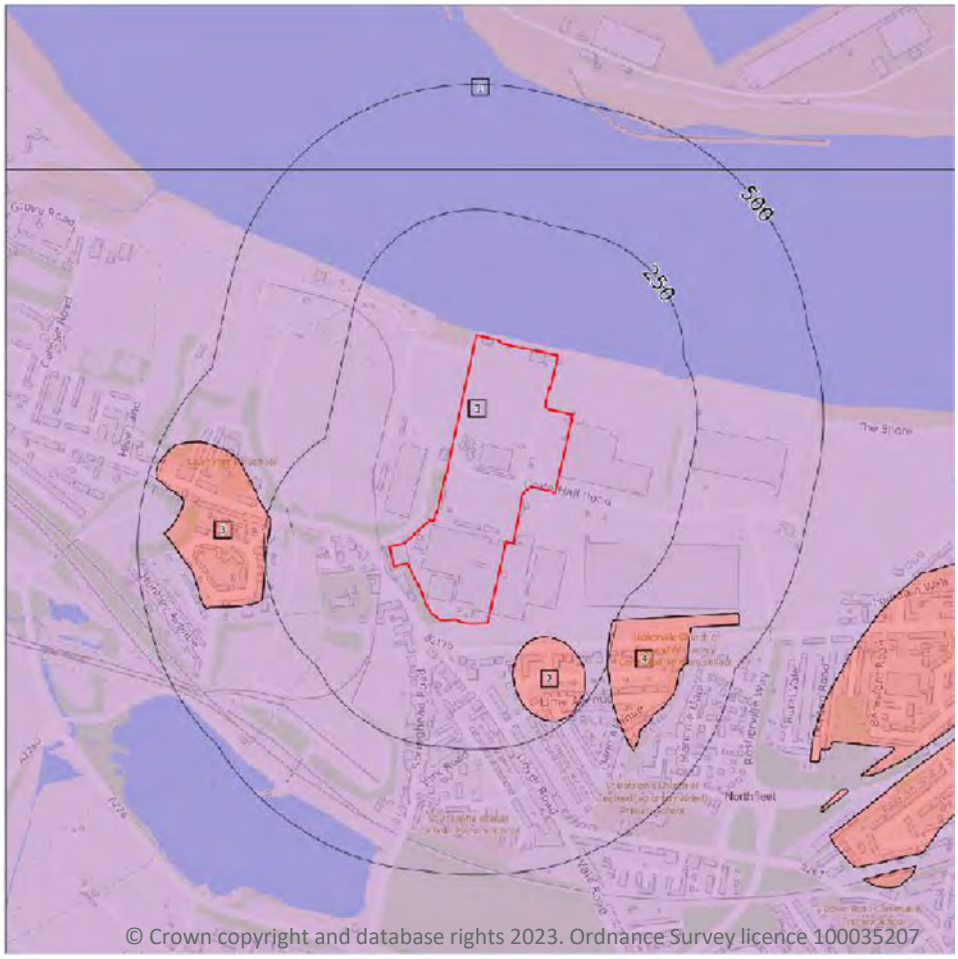
Features are displayed on the Hydrogeology map on **page 116 >**

ID	Location	Designation	Description
1	**On site**	**Secondary Undifferentiated**	**Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type**
2	34m N	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

ID	Location	Designation	Description
3	310m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	330m N	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
5	467m E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
6	498m NE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	5

Aquifer status of groundwater held within bedrock geology.

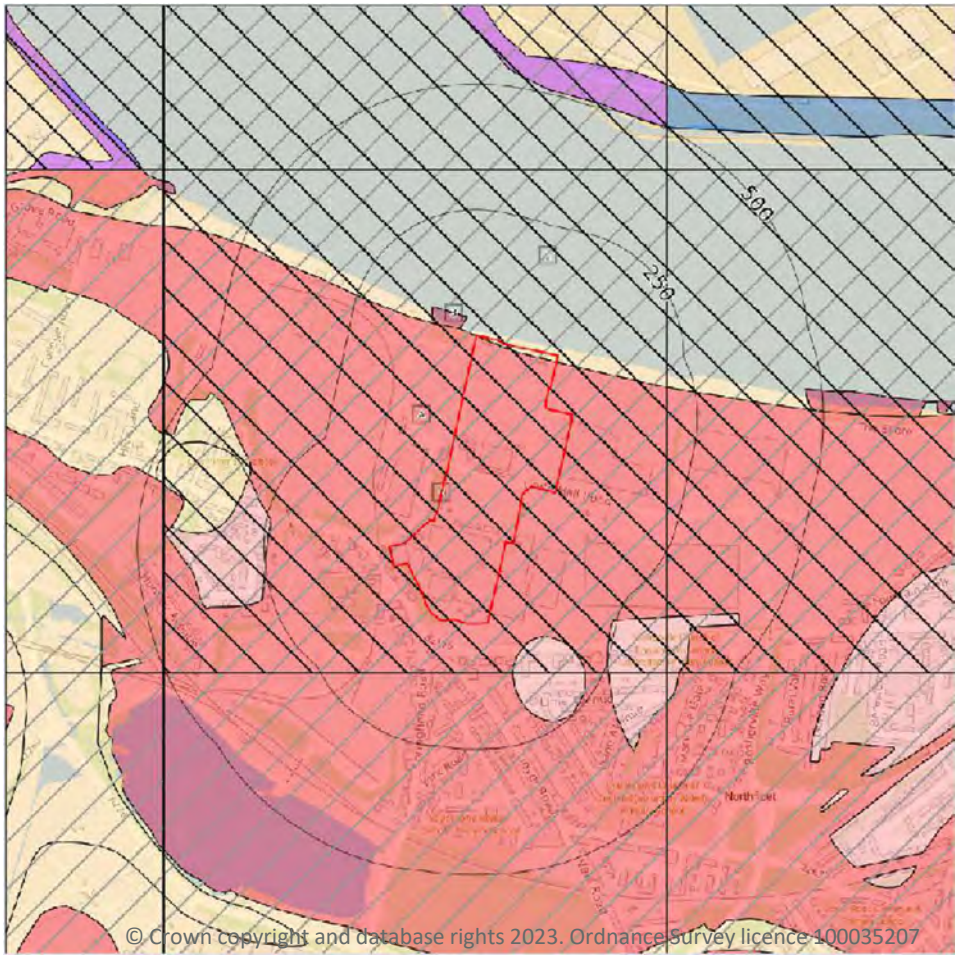
Features are displayed on the Bedrock aquifer map on **page 118 >**

ID	Location	Designation	Description
1	**On site**	**Principal**	**Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers**
2	85m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	240m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	241m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	330m N	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 120 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: 3-10m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures**
2	**On site**	**Summary Classification: Principal bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: - Aquifer type: - Thickness: 3-10m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures**
3	34m N	Summary Classification: Principal bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Unproductive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: Unproductive Aquifer type: Unproductive Thickness: 3-10m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**1**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	**Very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence or dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface or subsurface water flow.**	**3.0%**

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

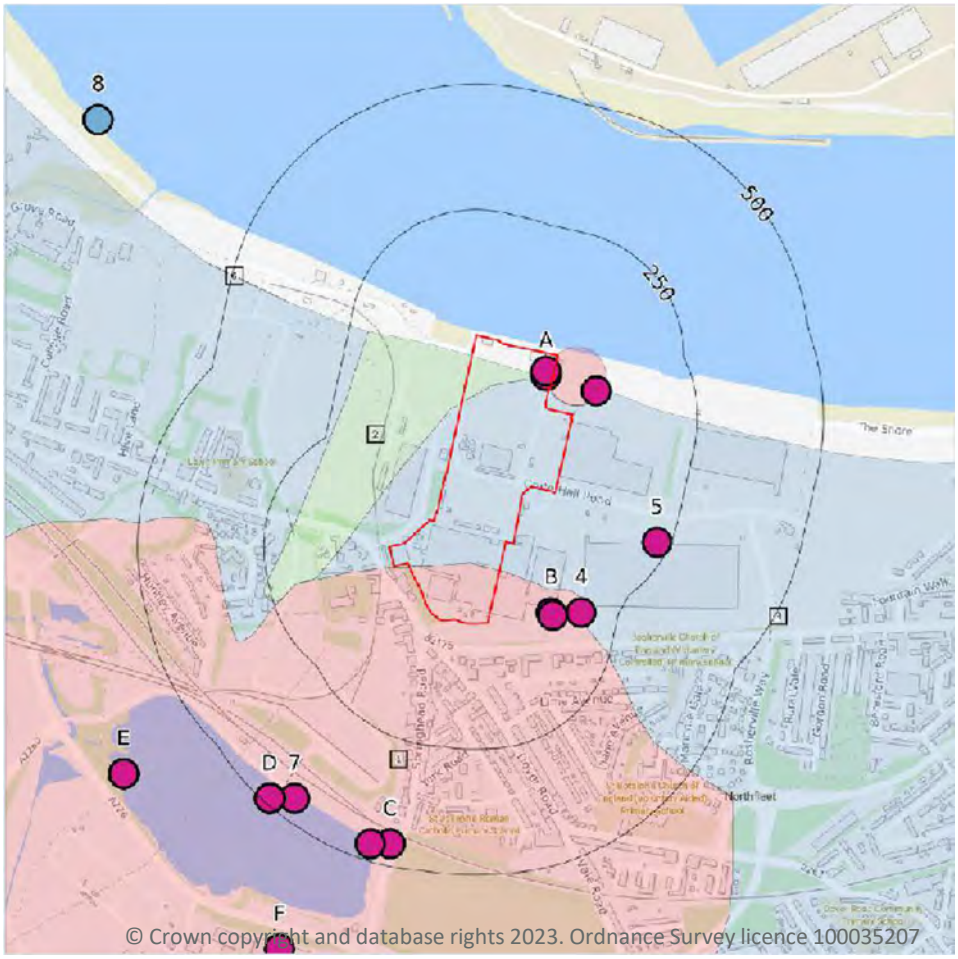
Records on site	1

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

ID	Summary	Additional information
A	**Potentially increased vulnerability of the bedrock aquifer due to limited cover by superficial deposits**	**Removal of, or limited cover of, superficial deposits within the River Thames**

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

Source Protection Zone 1
Inner catchment

Source Protection Zone 2
Outer catchment

Source Protection Zone 3
Total catchment

Source Protection Zone 4
Zone of Special Interest

Source Protection Zone 1c
Inner catchment - confined aquifer

Source Protection Zone 2c
Outer catchment - confined aquifer

Source Protection Zone 3c
Total catchment - confined aquifer

Drinking water abstraction licences

Drinking water abstraction licences
Polygon features

Drinking water abstraction licences
Linear features

Groundwater abstraction licence (point)

Groundwater abstraction licence (area)

Groundwater abstraction licence (linear)

Surface Water Abstractions (point)

Surface Water Abstractions (area)

Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	40

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 123 >**

ID	Location	Details	
A	**On site**	**Status: Historical** **Licence No: 9/40/01/0092/A/GR** **Details: Boiler Feed** **Direct Source: Southern Region Groundwater** **Point: POINT A, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET** **Data Type: Point** **Name: Kimberly-Clark Limited** **Easting: 562760** **Northing: 174590**	**Annual Volume (m^3): 400000** **Max Daily Volume (m^3): 1309** **Original Application No: -** **Original Start Date: 27/05/1966** **Expiry Date: 31/03/2018** **Issue No: 101** **Version Start Date: 24/04/2002** **Version End Date: -**
A	**On site**	**Status: Active** **Licence No: 9/40/01/0092/A/GR/R1** **Details: Boiler Feed** **Direct Source: Southern Region Groundwater** **Point: POINT A, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET** **Data Type: Point** **Name: Kimberly-Clark Limited** **Easting: 562759** **Northing: 174599**	**Annual Volume (m^3): 320000** **Max Daily Volume (m^3): 1309** **Original Application No: NPS/WR/024286** **Original Start Date: 01/04/2018** **Expiry Date: 31/03/2030** **Issue No: 1** **Version Start Date: 01/04/2018** **Version End Date: -**
A	68m NE	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT 1, GREENSAND BOREHOLE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562860 Northing: 174560	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/05/1966 Version End Date: -
B	118m SE	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562770 Northing: 174120	Annual Volume (m^3): 400000 Max Daily Volume (m^3): 1309 Original Application No: - Original Start Date: 27/05/1966 Expiry Date: 31/03/2018 Issue No: 101 Version Start Date: 24/04/2002 Version End Date: -

ID	Location	Details	
B	121m SE	Status: Active Licence No: 9/40/01/0092/A/GR/R1 Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT KIMBERLY CLARK, NORTHFLEET Data Type: Point Name: Kimberly-Clark Limited Easting: 562772 Northing: 174114	Annual Volume (m^3): 320000 Max Daily Volume (m^3): 1309 Original Application No: NPS/WR/024286 Original Start Date: 01/04/2018 Expiry Date: 31/03/2030 Issue No: 1 Version Start Date: 01/04/2018 Version End Date: -
4	177m SE	Status: Historical Licence No: 9/40/01/0092/A/GR Details: Boiler Feed Direct Source: Southern Region Groundwater Point: POINT 2, GREENSAND BOREHOLE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562830 Northing: 174120	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 27/05/1966 Version End Date: -
5	224m E	Status: Active Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: BOREHOLE 4, CRETE HALL ROAD, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562980 Northing: 174260	Annual Volume (m^3): 4710000 Max Daily Volume (m^3): 19656 Original Application No: WR.1969D Original Start Date: 27/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1996 Version End Date: -
C	456m S	Status: Active Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: BOREHOLE 2, H5 CHALK, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562450 Northing: 173660	Annual Volume (m^3): 4710000 Max Daily Volume (m^3): 19656 Original Application No: WR.1969D Original Start Date: 27/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1996 Version End Date: -
7	457m SW	Status: Active Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: BOREHOLE 3, SPRINGHEAD LAKE, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562260 Northing: 173750	Annual Volume (m^3): 4710000 Max Daily Volume (m^3): 19656 Original Application No: WR.1969D Original Start Date: 27/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1996 Version End Date: -

ID	Location	Details	
C	466m S	Status: Active Licence No: 9/40/01/0092/B/GR Details: Process Water Direct Source: Southern Region Groundwater Point: BOREHOLE 1, H5 CHALK, NORTHFLEET. Data Type: Point Name: Kimberly-Clark Limited Easting: 562410 Northing: 173660	Annual Volume (m^3): 4710000 Max Daily Volume (m^3): 19656 Original Application No: WR.1969D Original Start Date: 27/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/07/1996 Version End Date: -
D	488m SW	Status: Historical Licence No: 9/40/01/0051/GR Details: Evaporative Cooling Direct Source: Southern Region Groundwater Point: POINT A AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: LaFarge Cement UK PLC Easting: 562210 Northing: 173750	Annual Volume (m^3): 1235375 Max Daily Volume (m^3): 10060 Original Application No: - Original Start Date: 10/04/1967 Expiry Date: - Issue No: 103 Version Start Date: 27/11/2007 Version End Date: -
D	488m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Non-Evaporative Cooling Direct Source: Southern Region Groundwater Point: POINT A AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 562210 Northing: 173750	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
D	488m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Process Water Direct Source: Southern Region Groundwater Point: POINT A AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 562210 Northing: 173750	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -

ID	Location	Details	
D	488m SW	Status: Active Licence No: 9/40/01/0051/GR Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: POINT A AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 562210 Northing: 173750	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
D	488m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 562210 Northing: 173750	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
E	677m SW	Status: Historical Licence No: 9/40/01/0051/GR Details: Evaporative Cooling Direct Source: Southern Region Groundwater Point: POINT B AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: LaFarge Cement UK PLC Easting: 561920 Northing: 173800	Annual Volume (m^3): 1235375 Max Daily Volume (m^3): 10060 Original Application No: - Original Start Date: 10/04/1967 Expiry Date: - Issue No: 103 Version Start Date: 27/11/2007 Version End Date: -
E	677m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Non-Evaporative Cooling Direct Source: Southern Region Groundwater Point: POINT B AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 561920 Northing: 173800	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -

ID	Location	Details	
E	677m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Process Water Direct Source: Southern Region Groundwater Point: POINT B AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 561920 Northing: 173800	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
E	677m SW	Status: Active Licence No: 9/40/01/0051/GR Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT B AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 561920 Northing: 173800	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
E	677m SW	Status: Active Licence No: 9/40/01/0051/GR Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Southern Region Groundwater Point: POINT B AT BLUE LAKE NORTHFLEET CEMENT WORKS Data Type: Point Name: Tarmac Cement and Lime Limited Easting: 561920 Northing: 173800	Annual Volume (m^3): 1186000 Max Daily Volume (m^3): 3382 Original Application No: NPS/WR/035230 Original Start Date: 10/04/1967 Expiry Date: - Issue No: 105 Version Start Date: 26/02/2021 Version End Date: -
F	729m SW	Status: Historical Licence No: 01/144 Details: Laundry Use Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE AT SPRINGHEAD ENTERPRISE PARK Data Type: Point Name: Shaws Laundries Ltd Easting: 562230 Northing: 173450	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/07/2000 Expiry Date: 05/06/2003 Issue No: 1 Version Start Date: 28/07/2000 Version End Date: -

ID	Location	Details	
F	729m SW	Status: Historical Licence No: 01/154 Details: Laundry Use Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE AT SPRINGHEAD ENTERPRISE PARK Data Type: Point Name: Berendsen UK Limited Easting: 562230 Northing: 173450	Annual Volume (m^3): 120000 Max Daily Volume (m^3): 400 Original Application No: - Original Start Date: 03/05/2004 Expiry Date: 31/03/2018 Issue No: 5 Version Start Date: 05/12/2014 Version End Date: -
F	729m SW	Status: Active Licence No: 01/154/R01 Details: Laundry Use Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE AT SPRINGHEAD ENTERPRISE PARK Data Type: Point Name: Elis UK Limited Easting: 562230 Northing: 173450	Annual Volume (m^3): 120000 Max Daily Volume (m^3): 400 Original Application No: NPS/WR/035840 Original Start Date: 01/04/2018 Expiry Date: 31/03/2030 Issue No: 2 Version Start Date: 05/05/2021 Version End Date: -
-	1282m SW	Status: Historical Licence No: 9/40/01/0523/G Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A, WINGFIELD PARK FARM IN SOUTHFLEET. Data Type: Point Name: Beslee Farms Easting: 561900 Northing: 173000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 12/03/1996 Version End Date: -
-	1282m SW	Status: Historical Licence No: 01/0157 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A, WINGFIELD PARK FARM IN SOUTHFLEET. Data Type: Point Name: Ebbsfleet Investment (GP) Limited Easting: 561900 Northing: 173000	Annual Volume (m^3): 16843 Max Daily Volume (m^3): 682 Original Application No: - Original Start Date: 17/11/2004 Expiry Date: 31/03/2018 Issue No: 2 Version Start Date: 18/07/2014 Version End Date: -

ID	Location	Details	
-	1570m SW	Status: Active Licence No: 9/40/01/0504/G/R01 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172811	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 910 Original Application No: NPS/WR/012674 Original Start Date: 01/04/2014 Expiry Date: 31/03/2024 Issue No: 1 Version Start Date: 01/04/2014 Version End Date: -
-	1570m SW	Status: Active Licence No: 9/40/01/0504/G/R01 Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172811	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 910 Original Application No: NPS/WR/012674 Original Start Date: 01/04/2014 Expiry Date: 31/03/2024 Issue No: 1 Version Start Date: 01/04/2014 Version End Date: -
-	1571m SW	Status: Historical Licence No: 9/40/01/0504/G Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172810	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 909.6 Original Application No: - Original Start Date: - Expiry Date: 31/03/2014 Issue No: 101 Version Start Date: 27/11/2006 Version End Date: -
-	1571m SW	Status: Historical Licence No: 9/40/01/0504/G Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172810	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 909.6 Original Application No: - Original Start Date: - Expiry Date: 31/03/2014 Issue No: 101 Version Start Date: 27/11/2006 Version End Date: -
-	1625m SW	Status: Historical Licence No: 9/40/01/0504/G Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D.T.G. Elliott & Son Ltd. Easting: 561700 Northing: 172720	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 15/05/1978 Version End Date: -

ID	Location	Details	
-	1625m SW	Status: Historical Licence No: 9/40/01/0504/G Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET. Data Type: Point Name: D.T.G. Elliott & Son Ltd. Easting: 561700 Northing: 172720	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 15/05/1978 Version End Date: -
-	1654m SW	Status: Historical Licence No: 9/40/01/0504/G Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172710	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 909.6 Original Application No: - Original Start Date: - Expiry Date: 31/03/2014 Issue No: 101 Version Start Date: 27/11/2006 Version End Date: -
-	1654m SW	Status: Historical Licence No: 9/40/01/0504/G Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172710	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 909.6 Original Application No: - Original Start Date: - Expiry Date: 31/03/2014 Issue No: 101 Version Start Date: 27/11/2006 Version End Date: -
-	1654m SW	Status: Active Licence No: 9/40/01/0504/G/R01 Details: Spray Irrigation - Direct Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172710	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 910 Original Application No: NPS/WR/012674 Original Start Date: 01/04/2014 Expiry Date: 31/03/2024 Issue No: 1 Version Start Date: 01/04/2014 Version End Date: -
-	1654m SW	Status: Active Licence No: 9/40/01/0504/G/R01 Details: General Washing/Process Washing Direct Source: Southern Region Groundwater Point: POINT A, BOREHOLE, H5 CHALK, SOUTHFLEET Data Type: Point Name: D T G Elliott & Son Ltd Easting: 561660 Northing: 172710	Annual Volume (m^3): 5910 Max Daily Volume (m^3): 910 Original Application No: NPS/WR/012674 Original Start Date: 01/04/2014 Expiry Date: 31/03/2024 Issue No: 1 Version Start Date: 01/04/2014 Version End Date: -

ID	Location	Details	
-	1733m SW	Status: Historical Licence No: 01/152 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT SOUTHFLEET, KENT Data Type: Point Name: Thames Water Utilities Ltd Easting: 561161 Northing: 173057	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/07/2002 Expiry Date: 30/09/2004 Issue No: 1 Version Start Date: 07/07/2002 Version End Date: -
-	1738m SW	Status: Historical Licence No: 01/156 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 9198000 Max Daily Volume (m^3): 24200 Original Application No: - Original Start Date: 01/10/2004 Expiry Date: 31/03/2010 Issue No: 3 Version Start Date: 01/02/2008 Version End Date: -
-	1738m SW	Status: Historical Licence No: SO/040/0037/006 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 6716000 Max Daily Volume (m^3): 24200 Original Application No: - Original Start Date: 23/06/2010 Expiry Date: 31/03/2020 Issue No: 1 Version Start Date: 23/06/2010 Version End Date: -
-	1738m SW	Status: Active Licence No: SO/040/0037/006/R01 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 6716000 Max Daily Volume (m^3): 24200 Original Application No: NPS/WR/033754 Original Start Date: 01/04/2020 Expiry Date: 31/03/2026 Issue No: 2 Version Start Date: 20/04/2020 Version End Date: -

ID	Location	Details	
-	1762m SW	Status: Historical Licence No: 9/40/01/0088/B/GR Details: Process water Direct Source: Southern Region Groundwater Point: POINT 1, WELL NR. NEW BARN IN SWANSCOMBE, KENT. Data Type: Point Name: Empire Paper Limited Easting: 561130 Northing: 173050	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 30/07/1993 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m **1**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 123 >**

ID	Location	Details	
8	865m NW	Status: Active Licence No: 9/40/01/0522/S Details: Mineral Washing Direct Source: Southern Region Surface Waters Point: POINT A, TIDAL RIVER THAMES AT SWANSCOMBE. Data Type: Point Name: Robert Brett & Sons Ltd Easting: 561870 Northing: 175100	Annual Volume (m^3): 45500 Max Daily Volume (m^3): 375 Original Application No: 169/872 Original Start Date: 06/02/1990 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2002 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m **4**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 123 >**

ID	Location	Details	
-	1733m SW	Status: Historical Licence No: 01/152 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: POINT B, BOREHOLE AT SOUTHFLEET, KENT Data Type: Point Name: Thames Water Utilities Ltd Easting: 561161 Northing: 173057	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/07/2002 Expiry Date: 30/09/2004 Issue No: 1 Version Start Date: 07/07/2002 Version End Date: -
-	1738m SW	Status: Historical Licence No: 01/156 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 9198000 Max Daily Volume (m^3): 24200 Original Application No: - Original Start Date: 01/10/2004 Expiry Date: 31/03/2010 Issue No: 3 Version Start Date: 01/02/2008 Version End Date: -
-	1738m SW	Status: Historical Licence No: SO/040/0037/006 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 6716000 Max Daily Volume (m^3): 24200 Original Application No: - Original Start Date: 23/06/2010 Expiry Date: 31/03/2020 Issue No: 1 Version Start Date: 23/06/2010 Version End Date: -
-	1738m SW	Status: Active Licence No: SO/040/0037/006/R01 Details: Potable Water Supply - Direct Direct Source: Southern Region Groundwater Point: BOREHOLE POINT F, (EPM) SOUTHFLEET (BOREHOLE & TWO AUDITS) Data Type: Point Name: Thames Water Utilities Ltd Easting: 561160 Northing: 173050	Annual Volume (m^3): 6716000 Max Daily Volume (m^3): 24200 Original Application No: NPS/WR/033754 Original Start Date: 01/04/2020 Expiry Date: 31/03/2026 Issue No: 2 Version Start Date: 20/04/2020 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	10

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 123 >**

ID	Location	Type	Description
1	**On site**	**1**	**Inner catchment**
2	**On site**	**3**	**Total catchment**
3	**On site**	**2**	**Outer catchment**
A	**On site**	**1**	**Inner catchment**
A	**On site**	**3**	**Total catchment**
A	18m NE	3	Total catchment
A	18m NE	3	Total catchment
A	24m NE	3	Total catchment
A	41m NE	3	Total catchment
6	378m NW	3	Total catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology

Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	0

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 136 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**Coastal Catchment**	**Not part of a river WB catchment**	**130**	**Lower Medway**	**Medway**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 136 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
1	2m N	Transi	THAMES MIDDLE	GB530603911402 ↗	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 136 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**North Kent Medway Chalk**	**GB40601G500300** ↗	**Poor**	**Poor**	**Poor**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

Site Outline

Search buffers in metres (m)

River and coastal flooding:

High

Medium

Low

Very Low

Historical Flood Events

Areas Used for Flood Storage

Areas Benefiting from Flood Defences

Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	2

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 139 >**

Distance	Flood risk category
On site	**Very Low**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**0**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**2**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

Features are displayed on the River and coastal flooding map on **page 139 >**

ID	Location	Update
2	**On site**	**08/11/2022**
A	8m N	08/11/2022

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	**1**

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 139 >**

ID	Location	
3	**On site**	**Area benefiting from flood defences**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	**0**

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 139 >**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 139 >**

Location	Type
On site	**Zone 3 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding

Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 144 >**

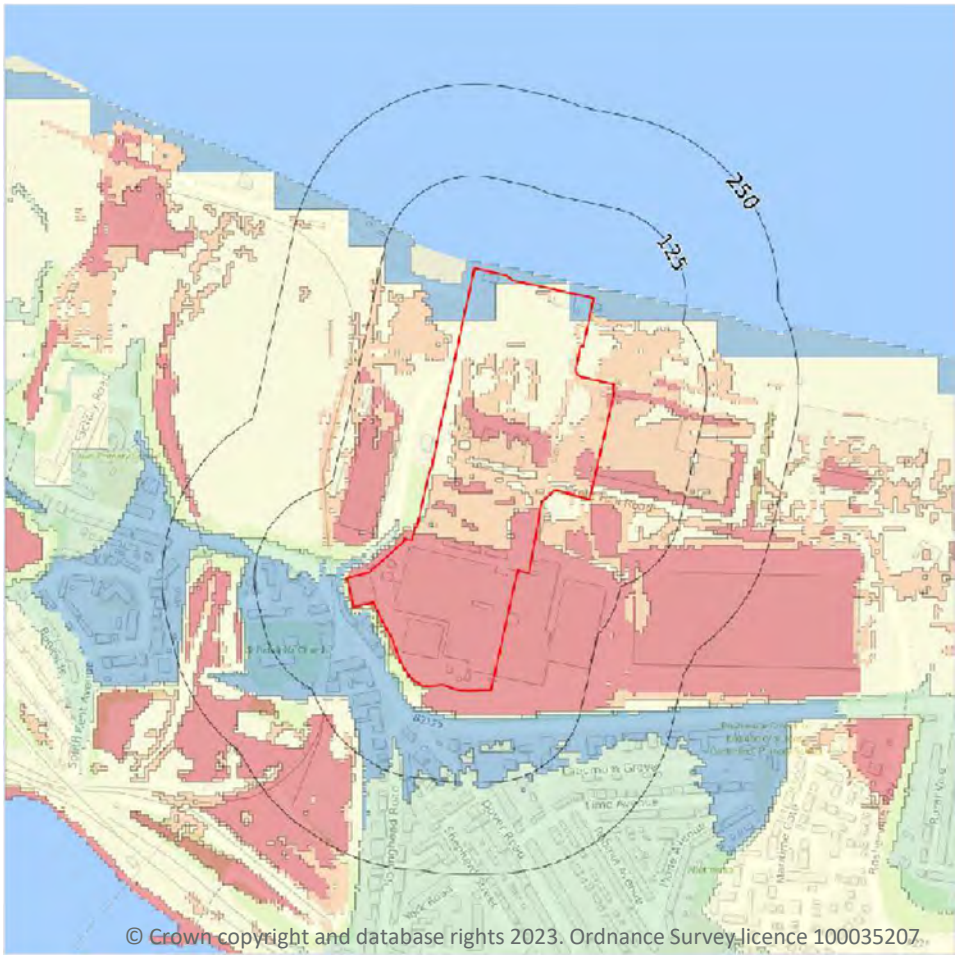
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

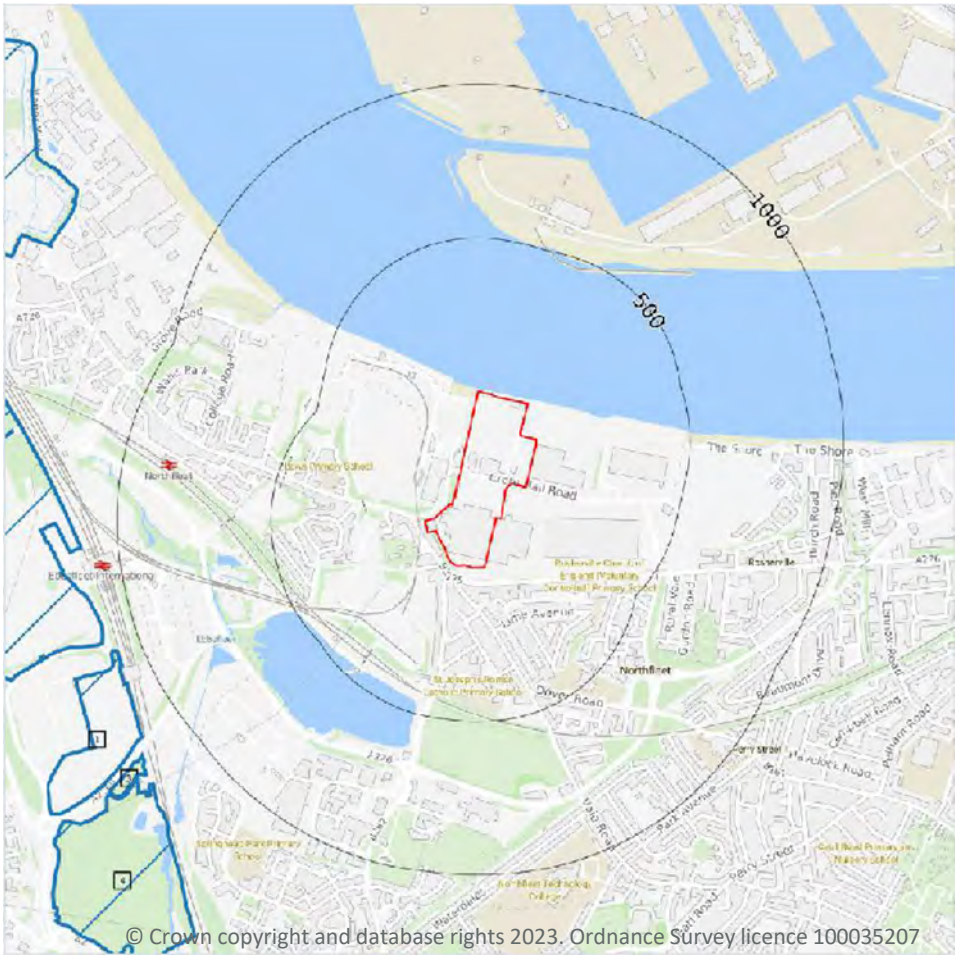
Highest risk on site	**High**
Highest risk within 50m	**High**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 146 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	7

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 147 >**

ID	Location	Name	Data source
1	1080m SW	Swanscombe Peninsula	Natural England

ID	Location	Name	Data source
2	1103m W	Swanscombe Peninsula	Natural England
3	1178m SW	Swanscombe Peninsula	Natural England
4	1209m SW	Swanscombe Peninsula	Natural England
5	1442m NW	Swanscombe Peninsula	Natural England
-	1503m W	Swanscombe Peninsula	Natural England
-	1966m W	Swanscombe Peninsula	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	2

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 147 >**

ID	Location	Name	Local Authority name
-	1766m SW	London	Dartford
-	1974m S	London	Gravesham

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

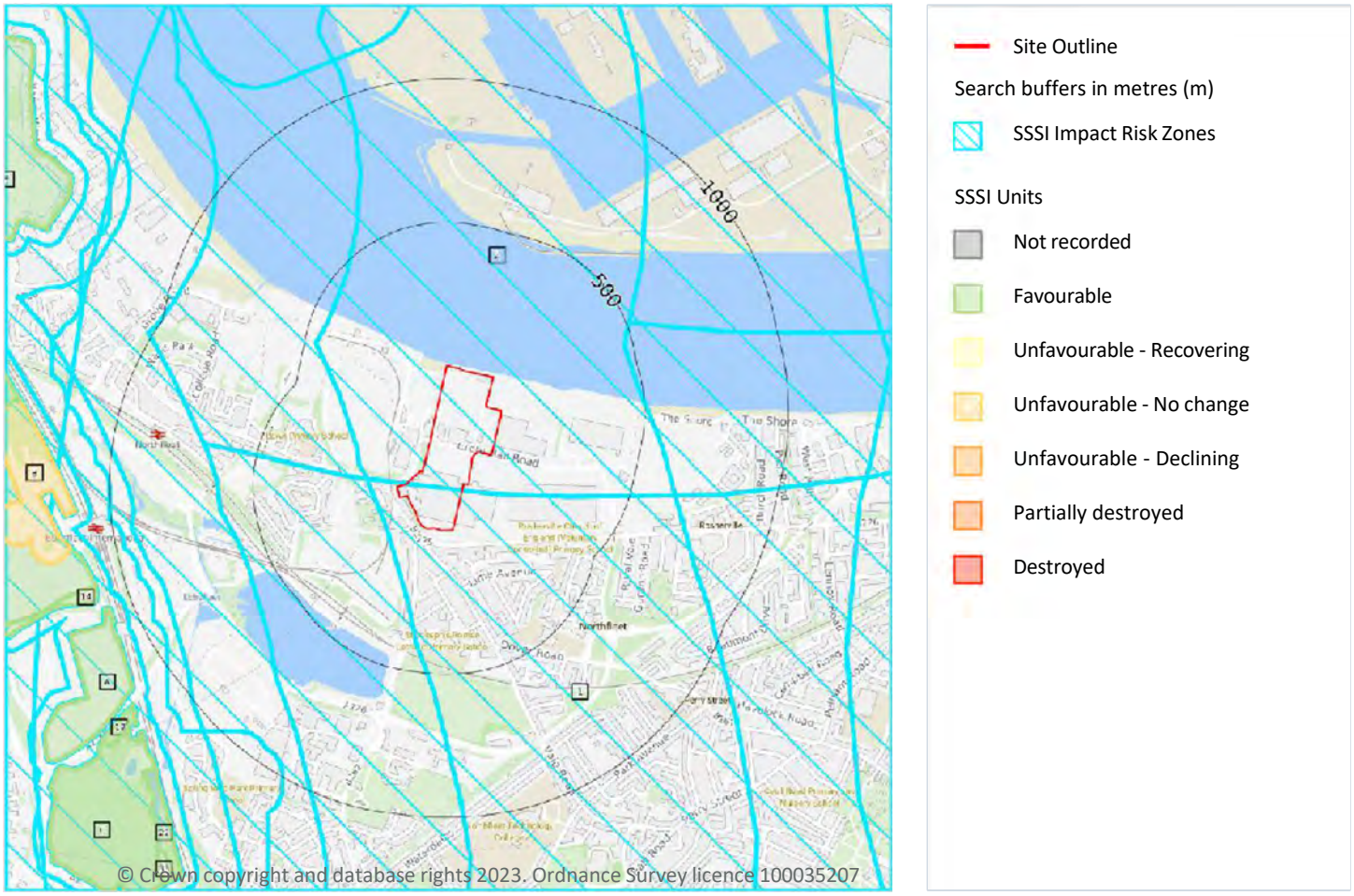
Records within 2000m	1

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
214m SW	North Kent	Groundwater	65	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



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10.17 SSSI Impact Risk Zones

Records on site	2

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 153 >**

ID	Location	Type of developments requiring consultation
1	On site	**Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where footprint exceeds 1ha. Residential - Residential development of 50 units or more. Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas. Air pollution - Any industrial/agricultural development that could cause air pollution (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t). Combustion - General combustion processes >20mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Landfill. incl: inert landfill, non-hazardous landfill, hazardous landfill. Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream. Water supply - Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m² or more. Notes: Strategic solutions for recreational impacts are in place. please contact your local planning authority as they have the information to advise on specific requirements.**

ID	Location	Type of developments requiring consultation
2	On site	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where footprint exceeds 1ha. Residential - Residential development of 50 units or more. Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas. Air pollution - Any industrial/agricultural development that could cause air pollution (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t). Combustion - General combustion processes >20mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Landfill. incl: inert landfill, non-hazardous landfill, hazardous landfill. Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream. Water supply - Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m² or more. Notes: Strategic solutions for recreational impacts are in place. please contact your local planning authority as they have the information to advise on specific requirements.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**16**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 153 >**

ID:	A
Location:	1080m SW
SSSI name:	Swanscombe Peninsula
Unit name:	Station Quarters
Broad habitat:	
Condition:	Favourable

Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: 13
Location: 1103m W
SSSI name: Swanscombe Peninsula
Unit name: Northfleet Landfill, West
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021
Vascular Plant Species: Vicia bithynica, Bithynian Vetch	Favourable	11/03/2021

ID: 14
Location: 1103m W
SSSI name: Swanscombe Peninsula
Unit name: Station Quarters
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021

Feature name	Feature condition	Date of assessment
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: B
Location: 1121m W
SSSI name: Swanscombe Peninsula
Unit name: Baker's Hole
Broad habitat:
Condition: Unfavourable - No change
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
FM - Quaternary of the Thames	Unfavourable - No change	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021

ID: 19
Location: 1178m SW
SSSI name: Swanscombe Peninsula
Unit name: Ebbsfleet Valley, West
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: C
Location: 1209m SW
SSSI name: Swanscombe Peninsula
Unit name: Ebbsfleet Valley, West
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: 22
Location: 1254m SW
SSSI name: Swanscombe Peninsula
Unit name: Ebbsfleet Valley, East
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021

ID: 30
Location: 1344m W
SSSI name: Swanscombe Peninsula
Unit name: Bamber Pit, South
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021

ID: -
Location: 1429m W
SSSI name: Swanscombe Peninsula
Unit name: Bamber Pit, North
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021

ID: F
Location: 1442m NW
SSSI name: Swanscombe Peninsula
Unit name: Botany Marsh East
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021

Feature name	Feature condition	Date of assessment
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Invert. assemblage M311 saltmarsh and transitional brackish marsh	Favourable	11/03/2021
Invert. assemblage W211 open water on disturbed sediments	Favourable	11/03/2021
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: 33
Location: 1447m SW
SSSI name: Swanscombe Peninsula
Unit name: Spring Head
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021

ID: -
Location: 1503m W
SSSI name: Swanscombe Peninsula
Unit name: Sports Field East Quarry
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021

ID: -
Location: 1743m NW
SSSI name: Swanscombe Peninsula
Unit name: Botany Marsh West, South
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Invert. assemblage M311 saltmarsh and transitional brackish marsh	Favourable	11/03/2021
Invert. assemblage W211 open water on disturbed sediments	Favourable	11/03/2021

ID: -
Location: 1818m NW
SSSI name: Swanscombe Peninsula
Unit name: Botany Marsh West, North
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Invert. assemblage M311 saltmarsh and transitional brackish marsh	Favourable	11/03/2021
Invert. assemblage W211 open water on disturbed sediments	Favourable	11/03/2021
Vascular Plant Species: Bupleurum tenuissimum, Slender Hare's-ear	Favourable	11/03/2021
Vascular Plant Species: Carex divisa, Divided Sedge	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021

ID: -
Location: 1952m NW
SSSI name: Swanscombe Peninsula
Unit name: Broadness
Broad habitat:
Condition: Favourable
Reportable features:

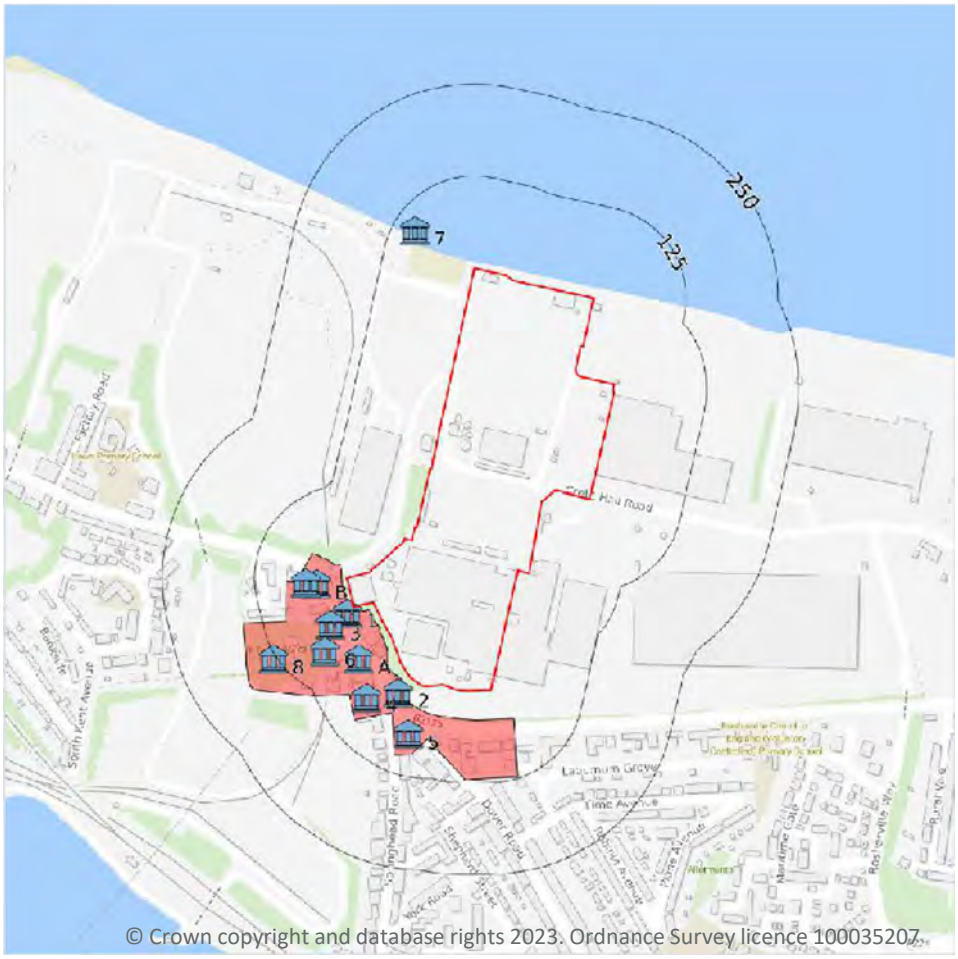
Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	11/03/2021
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Invert. assemblage M311 saltmarsh and transitional brackish marsh	Favourable	11/03/2021
Vascular Plant Species: Bupleurum tenuissimum, Slender Hare's-ear	Favourable	11/03/2021
Vascular Plant Species: Lathyrus aphaca, Yellow Vetchling	Favourable	11/03/2021
Vascular Plant Species: Vicia bithynica, Bithynian Vetch	Favourable	11/03/2021

ID: -
Location: 1966m W
SSSI name: Swanscombe Peninsula
Unit name: Craylands Pit
Broad habitat:
Condition: Favourable
Reportable features:

Feature name	Feature condition	Date of assessment
Assemblages of breeding birds - Scrub	Favourable	11/03/2021
Invert. assemblage F111 bare sand & chalk	Favourable	11/03/2021
Invert. assemblage F112 open short sward	Favourable	11/03/2021
Invert. assemblage M311 saltmarsh and transitional brackish marsh	Favourable	11/03/2021

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



Site Outline

Search buffers in metres (m)

Listed buildings

Conservation areas

Conservation areas - no data

National Parks

Areas of Outstanding Natural Beauty

Registered parks and gardens

Scheduled Monuments

World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	11

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 163 >**

ID	Location	Name	Grade	Reference Number	Listed date
1	12m SW	31, The Hill, Northfleet, Gravesham, Kent, DA11	II	1081096	26/07/1983
2	26m SW	K6 Telephone Kiosk, Northfleet, Gravesham, Kent, DA11	II	1083902	31/03/1988
3	40m SW	The Coach and Horses Public House, Northfleet, Gravesham, Kent, DA11	II	1081095	26/07/1983
B	43m SW	Garden Wall and Gate Piers To Nos 1 and 2, Northfleet, Gravesham, Kent, DA11	II	1081090	26/07/1983
A	52m SW	7, The Hill, Northfleet, Gravesham, Kent, DA11	II	1367390	26/07/1983

ID	Location	Name	Grade	Reference Number	Listed date
B	56m SW	1 and 2, Granby Place, Northfleet, Gravesham, Kent, DA11	II	1367458	26/07/1983
4	64m SW	Church of Our Lady of The Assumption, Northfleet, Gravesham, Kent, DA11	II*	1081094	26/07/1983
5	68m S	Ye Olde Leather Bottel, Northfleet, Gravesham, Kent, DA11	II	1350210	26/07/1983
6	72m SW	Northfleet War Memorial, Northfleet, Gravesham, Kent, DA11	II	1430440	23/10/2015
7	95m N	Northfleet Lower Lighthouse, Northfleet, Gravesham, Kent, DA11	II	1392254	01/11/2006
8	130m SW	Parish Church of St Botolph, Northfleet, Gravesham, Kent, DA11	I	1054093	04/07/1952

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	**1**

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 163 >**

ID	Location	Name	District	Date of designation
A	7m SW	The Hill, Northfleet	Gravesham	01/02/1990

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	**0**

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

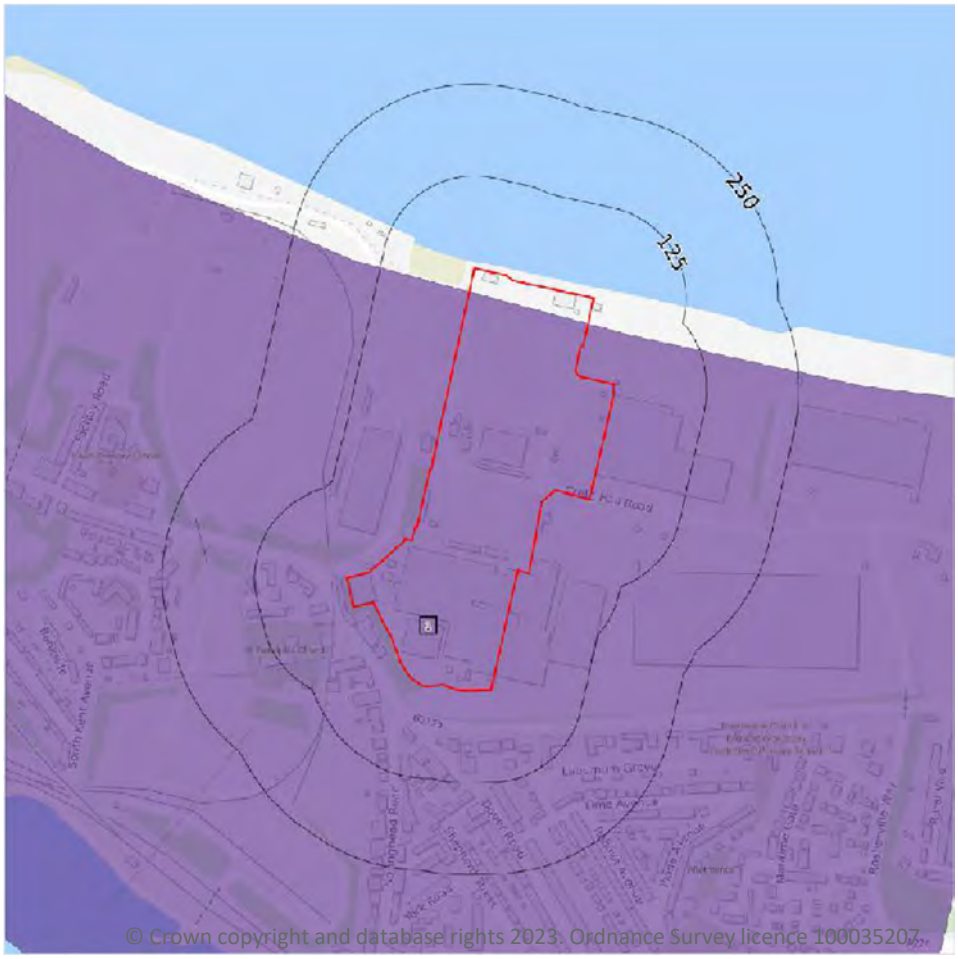
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 167 >**

ID	Location	Classification	Description
1	**On site**	**Urban**	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	9

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 169 >**

ID	Location	Main Habitat	Other habitats
1	On site	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	On site	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	On site	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	On site	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	14m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	30m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	183m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
10	184m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
11	193m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**1**

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

Features are displayed on the Habitat designations map on **page 169 >**

ID	Location	Type	Habitat
12	219m N	Network Enhancement Zone 2	Not specified

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	**2**

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

Features are displayed on the Habitat designations map on **page 169 >**

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
7	61m E	Rosherville (former works)	High	BugLife All Of A Buzz Data	UK Perspectives Aerial Photography	-

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
8	82m SW	Northfleet (disused pits); BRITPITS ref: 131039	High	BugLife All Of A Buzz Data	British Geological Survey BRITPITS database	UK Perspectives Aerial Photography

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability

14.1 10k Availability

Records within 500m	2

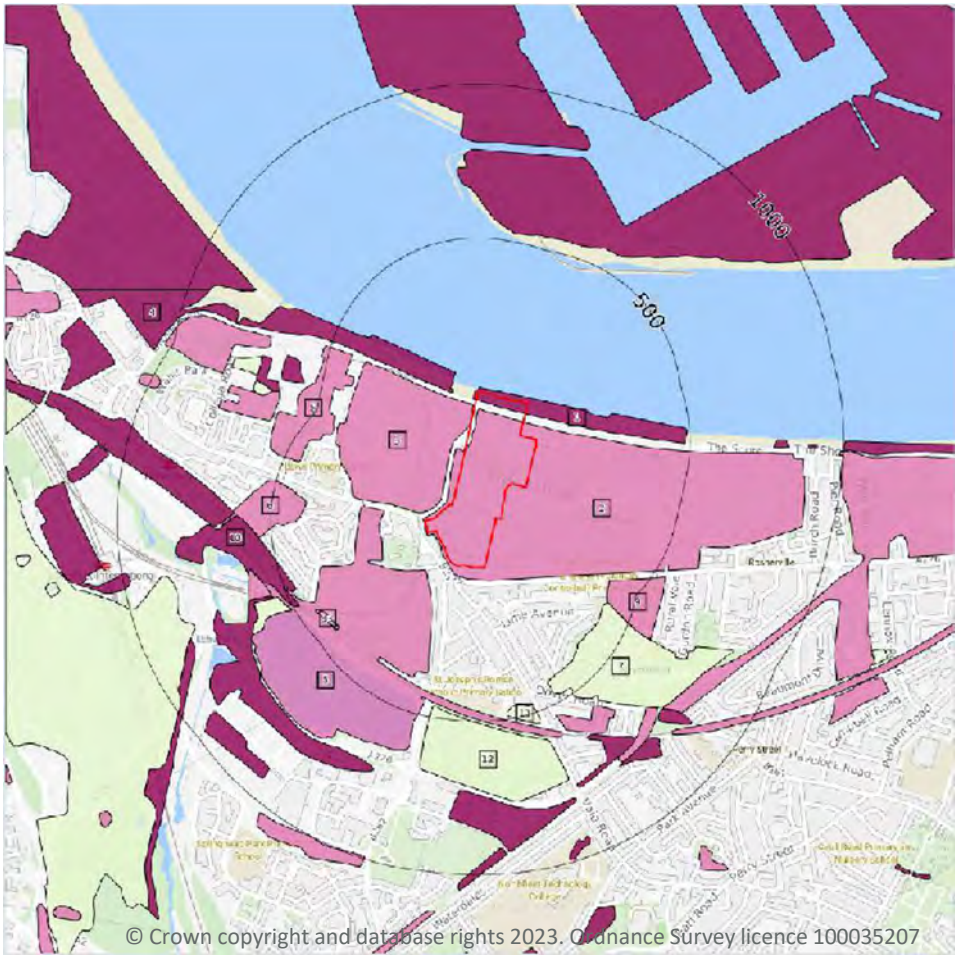
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 172 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**TQ67SW**
2	330m N	Full	Full	Full	No coverage	TQ67NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	13

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

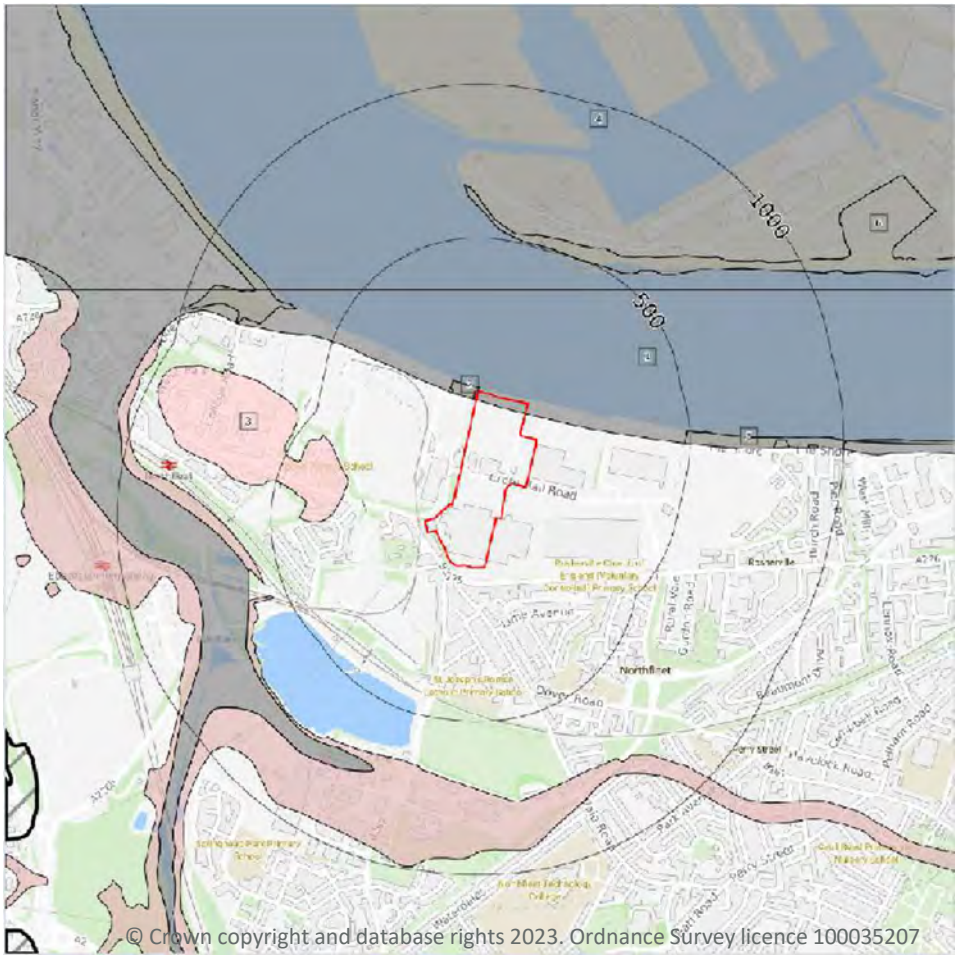
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 173 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**Made Ground (Undivided)**	**Artificial Deposit**
2	**On site**	**WGR-VOID**	**Worked Ground (Undivided)**	**Void**
3	2m N	WGR-VOID	Worked Ground (Undivided)	Void
4	80m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

ID	Location	LEX Code	Description	Rock description
5	85m SW	WGR-VOID	Worked Ground (Undivided)	Void
6	390m W	WGR-VOID	Worked Ground (Undivided)	Void
7	392m SE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
8	402m NW	WGR-VOID	Worked Ground (Undivided)	Void
9	404m SE	WGR-VOID	Worked Ground (Undivided)	Void
10	419m SW	WGR-VOID	Worked Ground (Undivided)	Void
11	460m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
12	462m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
13	465m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **6**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 175 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-Z**	**Alluvium - Silt (unlithified Deposits Coding Scheme)**	**Silt**
2	3m N	TRD-Z	Tidal River Or Creek Deposits - Silt	Silt
3	277m W	BHT-XSV	Boyn Hill Gravel Member - Sand And Gravel	Sand And Gravel
4	330m N	ALV-Z	Alluvium - Silt (unlithified Deposits Coding Scheme)	Silt

ID	Location	LEX Code	Description	Rock description
5	483m E	TRD-Z	Tidal River Or Creek Deposits - Silt	Silt
6	498m NE	TRD-Z	Tidal River Or Creek Deposits - Silt	Silt

This data is sourced from the British Geological Survey.

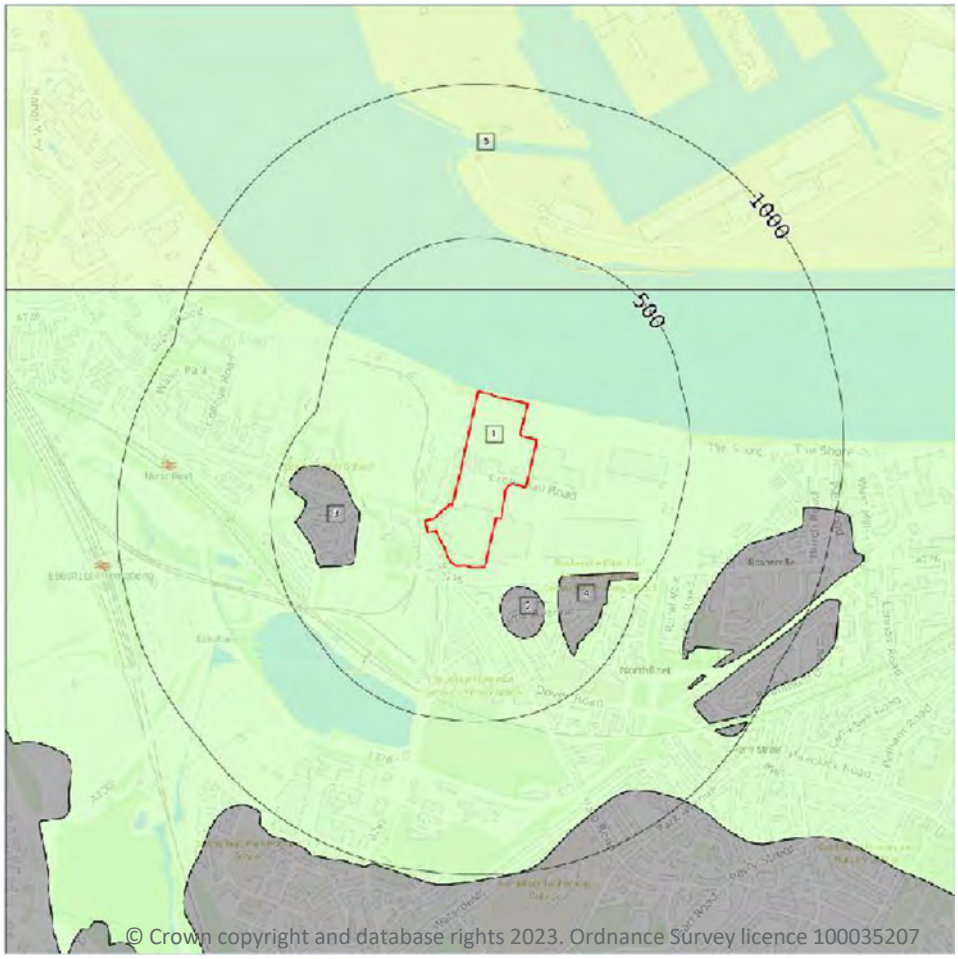
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



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Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **5**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 177 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**SECK-CHLK**	**Seaford Chalk Formation - Chalk**	**Santonian Age - Coniacian Age**
2	108m S	TAB-SANDU	Thanet Sand Formation - Sand	Thanetian Age
3	213m W	TAB-SANDU	Thanet Sand Formation - Sand	Thanetian Age
4	248m SE	TAB-SANDU	Thanet Sand Formation - Sand	Thanetian Age

ID	Location	LEX Code	Description	Rock age
5	330m N	CK-CHLK	Chalk Group - Chalk	Maastrichtian Age - Cenomanian Age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability

Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

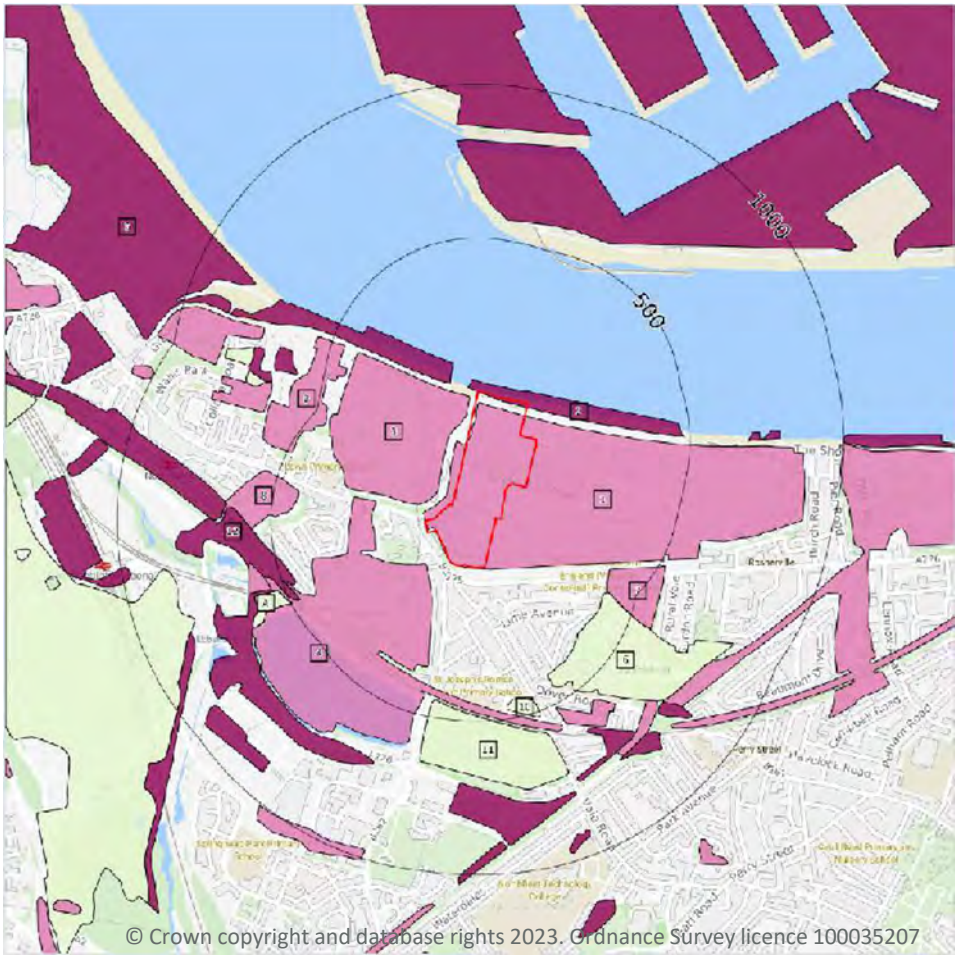
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 179 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW271_dartford_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

Made ground
Worked ground
Infilled ground
Disturbed ground
Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	13

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 180 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**WGR-VOID**	**WORKED GROUND (UNDIVIDED)**	**VOID**
2	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
3	20m N	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
4	75m SW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

ID	Location	LEX Code	Description	Rock description
5	94m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
6	371m SE	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
7	381m SE	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
8	419m W	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
9	432m NW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
10	440m S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
11	441m S	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
12	457m SW	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
A	498m SW	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

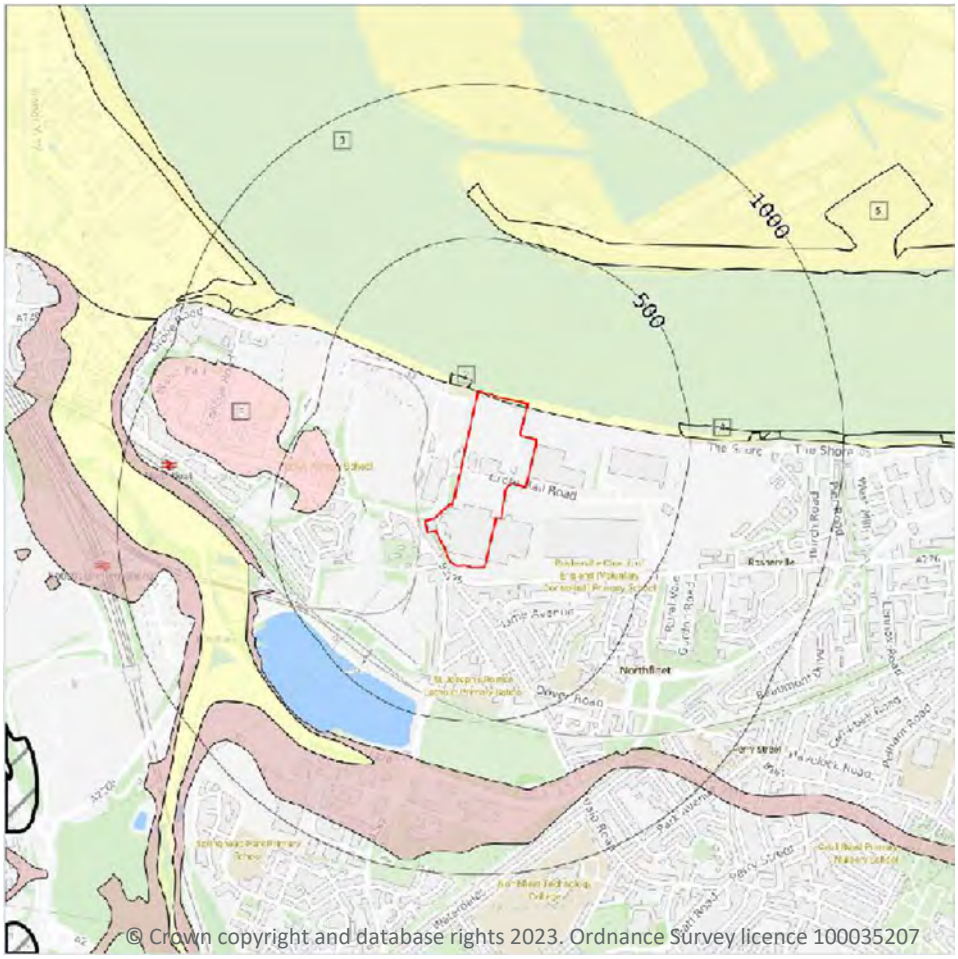
Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **5**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 182 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCZSP**	**ALLUVIUM**	**CLAY, SILT, SAND AND PEAT**
2	34m N	TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
3	310m W	BHT-XSV	BOYN HILL GRAVEL MEMBER	SAND AND GRAVEL
4	467m E	TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT

ID	Location	LEX Code	Description	Rock description
5	498m NE	TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**2**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Moderate**	**Very Low**
34m N	Intergranular	Low	Very Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

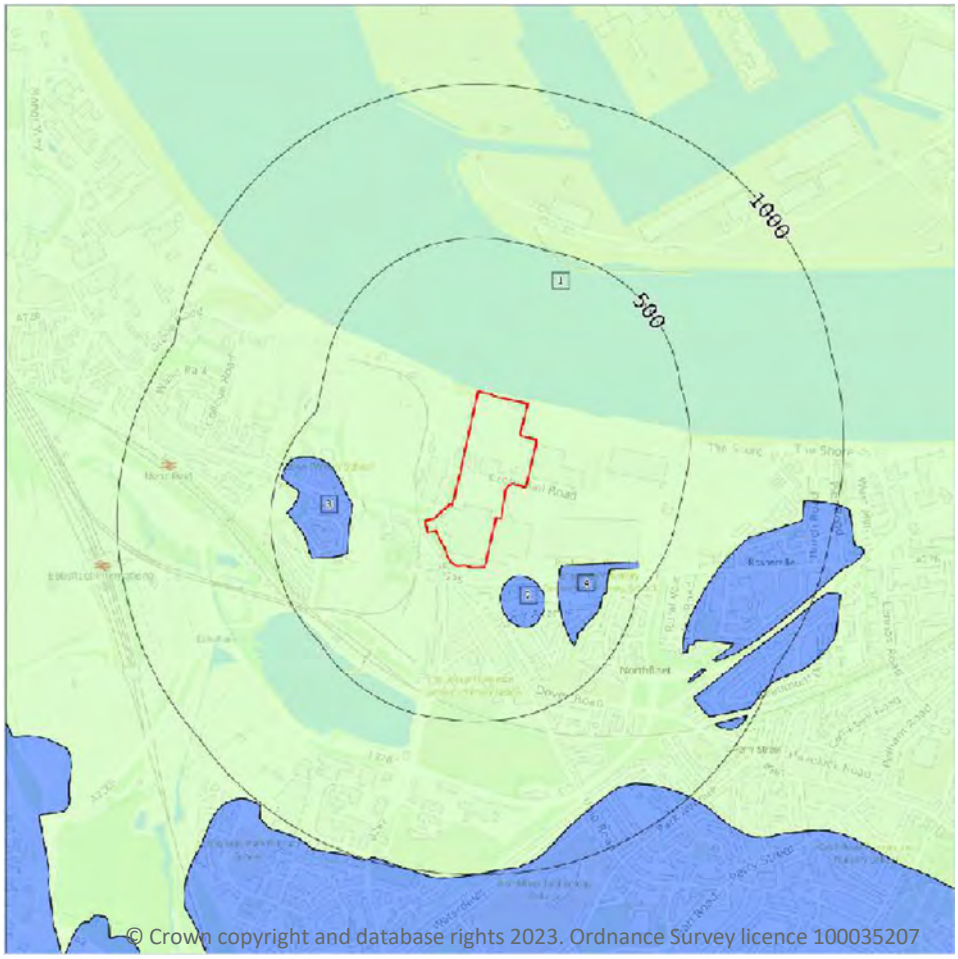
15.7 Landslip permeability (50k)

Records within 50m	**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **4**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 184 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LSNCK-CHLK**	**LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION (UNDIFFERENTIATED) - CHALK**	**TURONIAN**
2	85m S	TAB-S	THANET FORMATION - SAND	THANETIAN
3	240m W	TAB-S	THANET FORMATION - SAND	THANETIAN

ID	Location	LEX Code	Description	Rock age
4	241m SE	TAB-S	THANET FORMATION - SAND	THANETIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Very High**	**Very High**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes

Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m **37**

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 186 >**

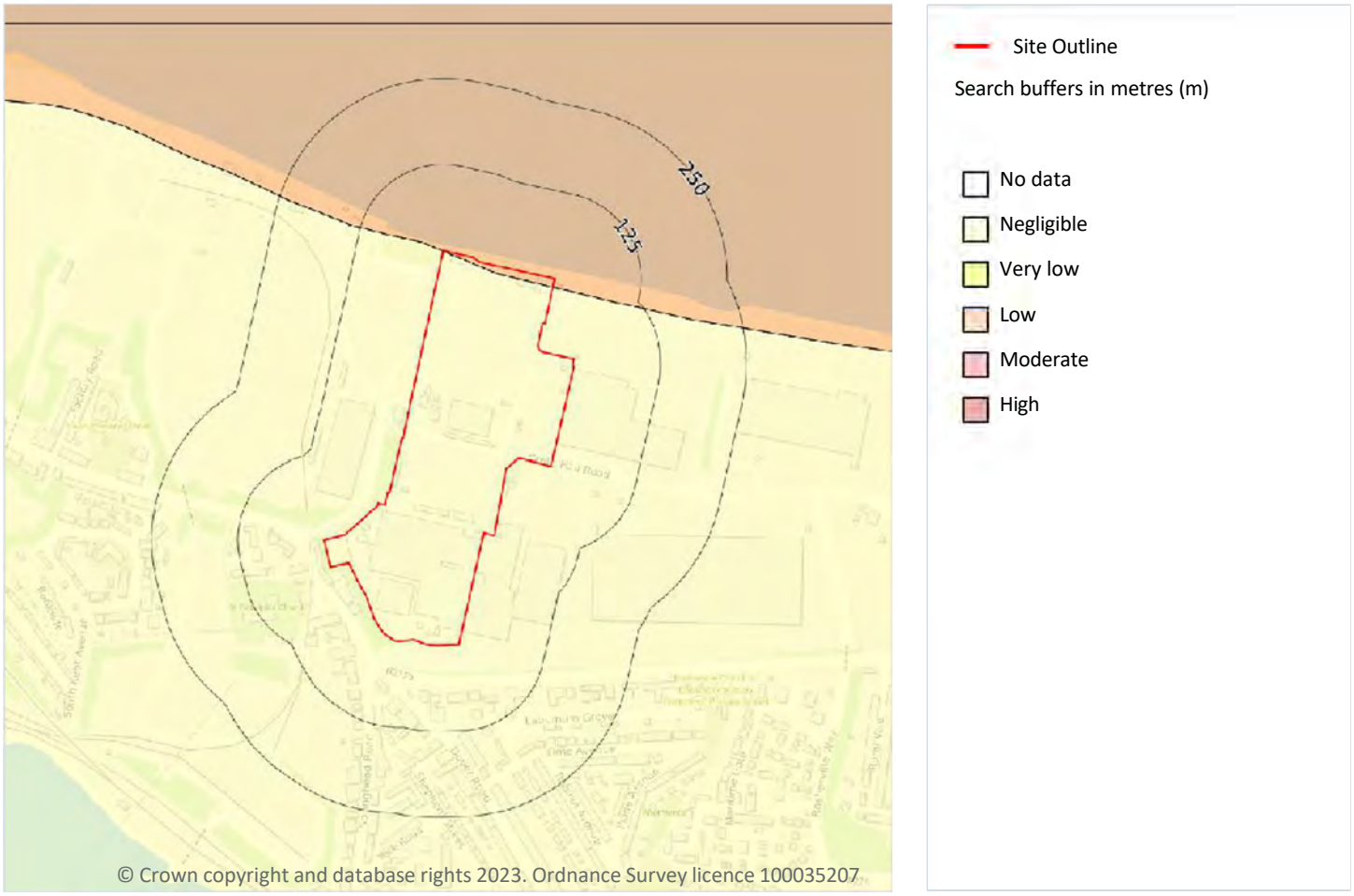
ID	Location	Grid reference	Name	Length	Confidential	Web link
A	On site	562800 174500	NORTHFLEET OLD DOCKYARD 2	60.96	N	838297 ↗
A	On site	562800 174500	NORTHFLEET OLD DOCKYARD 1	91.44	N	838296 ↗
A	On site	562800 174500	NORTHFLEET OLD DOCKYARD 4	45.72	N	838299 ↗

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	**On site**	**562800 174500**	**NORTHFLEET OLD DOCKYARD 3**	**78.18**	**N**	**838298** ↗
A	5m NE	562800 174520	CRETE HALL RD NORTHFLEET BH11	10.0	N	838738 ↗
A	7m NE	562810 174520	CRETE HALL RD NORTHFLEET BH10	3.0	N	838737 ↗
1	38m NE	562820 174550	CRETE HALL RD NORTHFLEET BH9	10.0	N	838736 ↗
2	42m SW	562450 174170	NORTHFLEET WORKS T7	28.65	N	838662 ↗
3	48m SW	562410 174280	NORTHFLEET WORKS T5	26.52	N	838660 ↗
B	64m NE	562840 174570	CRETE HALL RD NORTHFLEET BH8	20.0	N	838735 ↗
4	67m W	562470 174340	NORTHFLEET WORKS 25	18.59	N	838655 ↗
5	69m NE	562880 174500	CRETE HALL RD NORTHFLEET BH3	20.0	N	838730 ↗
B	76m NE	562860 174570	CRETE HALL RD NORTHFLEET BH5	10.0	N	838732 ↗
6	77m SW	562430 174140	NORTHFLEET WORKS T8	27.88	N	838663 ↗
7	84m NW	562490 174460	NORTHFLEET WORKS 5	17.52	N	838635 ↗
8	88m NE	562890 174550	CRETE HALL RD NORTHFLEET BH4	15.0	N	838731 ↗
9	90m W	562360 174270	NORTHFLEET WORKS T6	26.67	N	838661 ↗
B	91m NE	562870 174600	CRETE HALL RD NORTHFLEET BH7	20.0	N	838734 ↗
10	93m SE	562830 174280	NORTHFLEET POWER STATION	1.52	N	838854 ↗
B	93m NE	562870 174590	CRETE HALL RD NORTHFLEET BH6	10.0	N	838733 ↗
11	100m NE	562910 174510	CRETE HALL RD NORTHFLEET BH1	1.0	N	838729 ↗
12	142m NW	562470 174640	NORTHFLEET WORKS 24	36.58	N	838654 ↗
13	173m W	562280 174290	NORTHFLEET WORKS T4	26.82	N	838659 ↗
14	176m W	562310 174360	NORTHFLEET WORKS 1	17.83	N	838631 ↗
15	178m S	562610 173920	BREWERY TAP DOVER ROAD NORTHFLEET	106.68	N	838344 ↗
16	197m W	562320 174400	NORTHFLEET WORKS 2	15.85	N	838632 ↗
17	201m E	562970 174300	BOWATER PAPER MILLS GRAVESEND	76.2	N	838301 ↗
18	220m E	562980 174270	BOWATERS, NORTHFLEET	45.72	N	838826 ↗
19	225m E	563000 174320	NORTHFLEET POWER STATION	6.09	N	838832 ↗
20	229m E	563040 174500	BRITISH ELECTRICITY AUTH NORTHFLEET	13.71	N	838368 ↗
21	231m E	563040 174540	NORTHFLEET POWER STATION	12.19	N	838805 ↗

ID	Location	Grid reference	Name	Length	Confidential	Web link
C	234m NW	562380 174660	NORTHFLEET WORKS 23	36.58	N	838653 ↗
22	234m NW	562360 174570	NORTHFLEET WORKS 4	19.35	N	838634 ↗
23	239m W	562340 174500	NORTHFLEET WORKS 3	21.34	N	838633 ↗
C	242m NW	562370 174650	NORTHFLEET WORKS 6	19.2	N	838636 ↗
24	242m SW	562350 173959	CHANNEL TUNNEL RAIL LINK TP7835	4.0	N	15616248 ↗
25	242m SE	562990 174240	NORTHFLEET POWER STATION	4.87	N	838833 ↗

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



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17.1 Shrink swell clays

Records within 50m	2

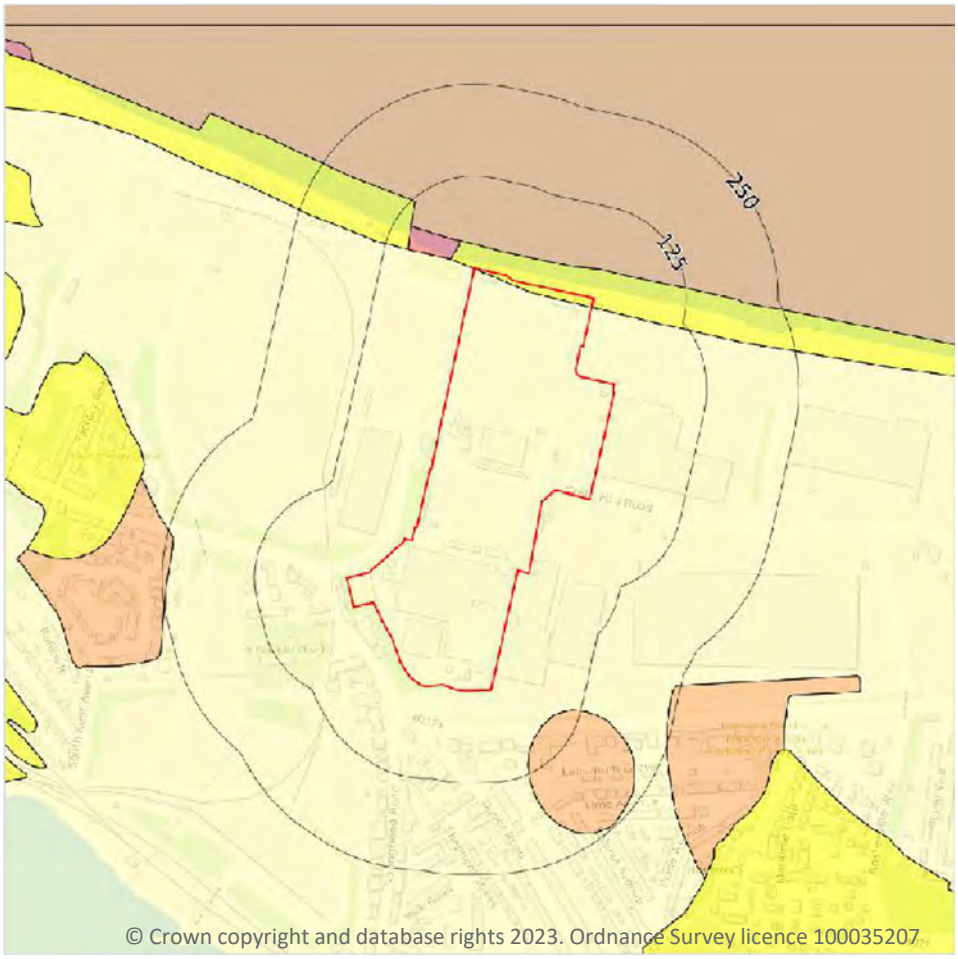
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 189 >**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Low**	**Ground conditions predominantly medium plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	4

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

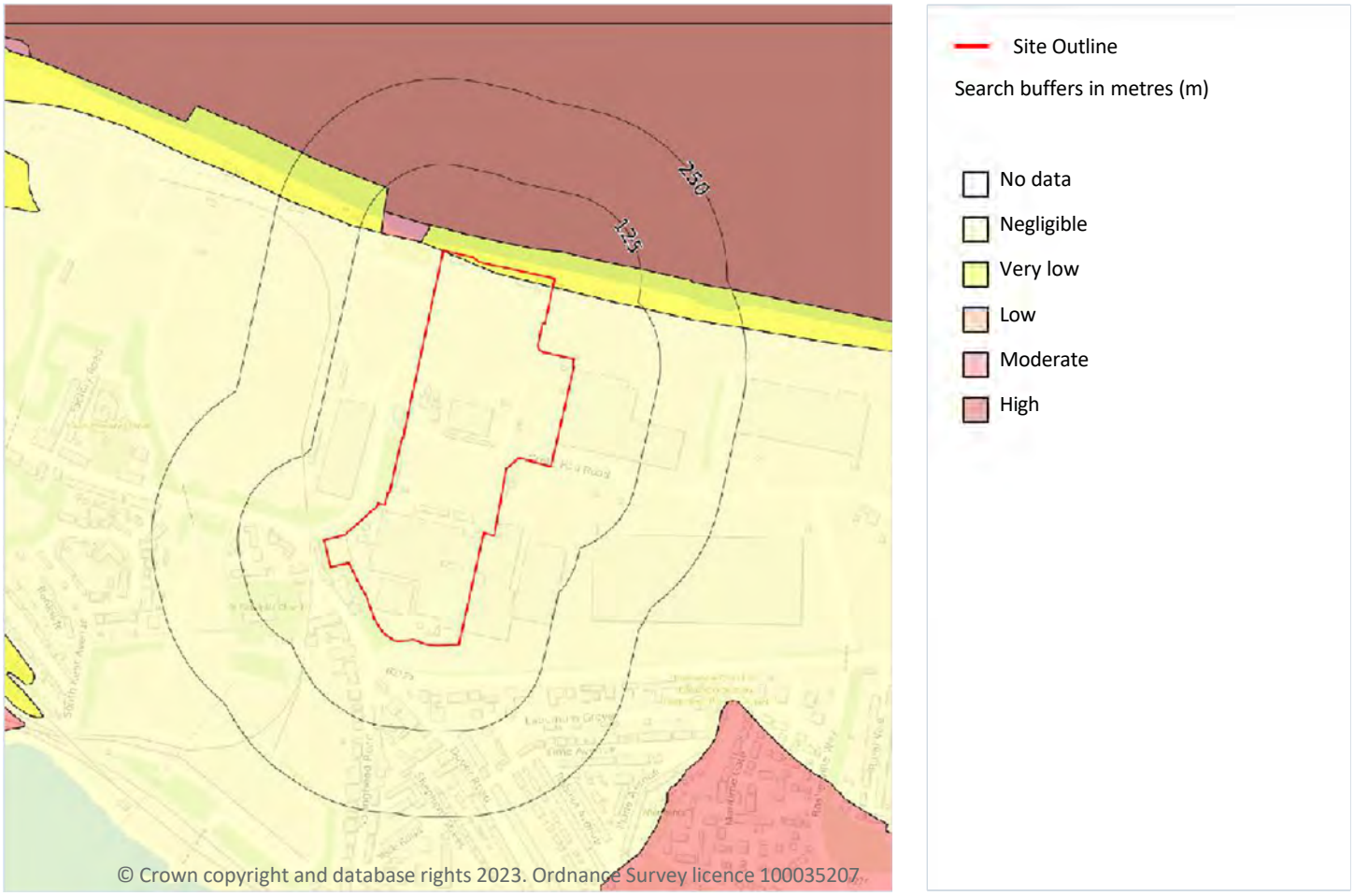
Features are displayed on the Natural ground subsidence - Running sands map on **page 190 >**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**
30m N	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
34m N	Moderate	Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m	4

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

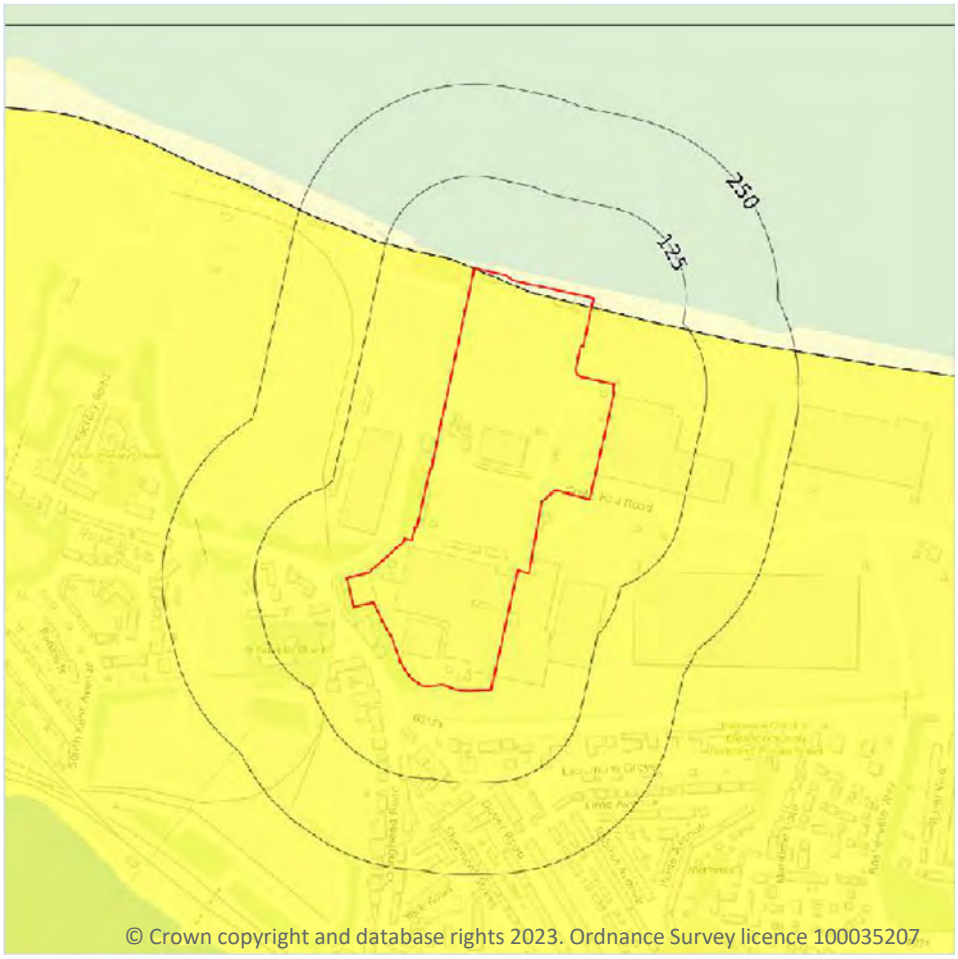
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 192 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**

Location	Hazard rating	Details
30m N	High	Highly compressible strata present. Significant constraint on land use depending on thickness.
34m N	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

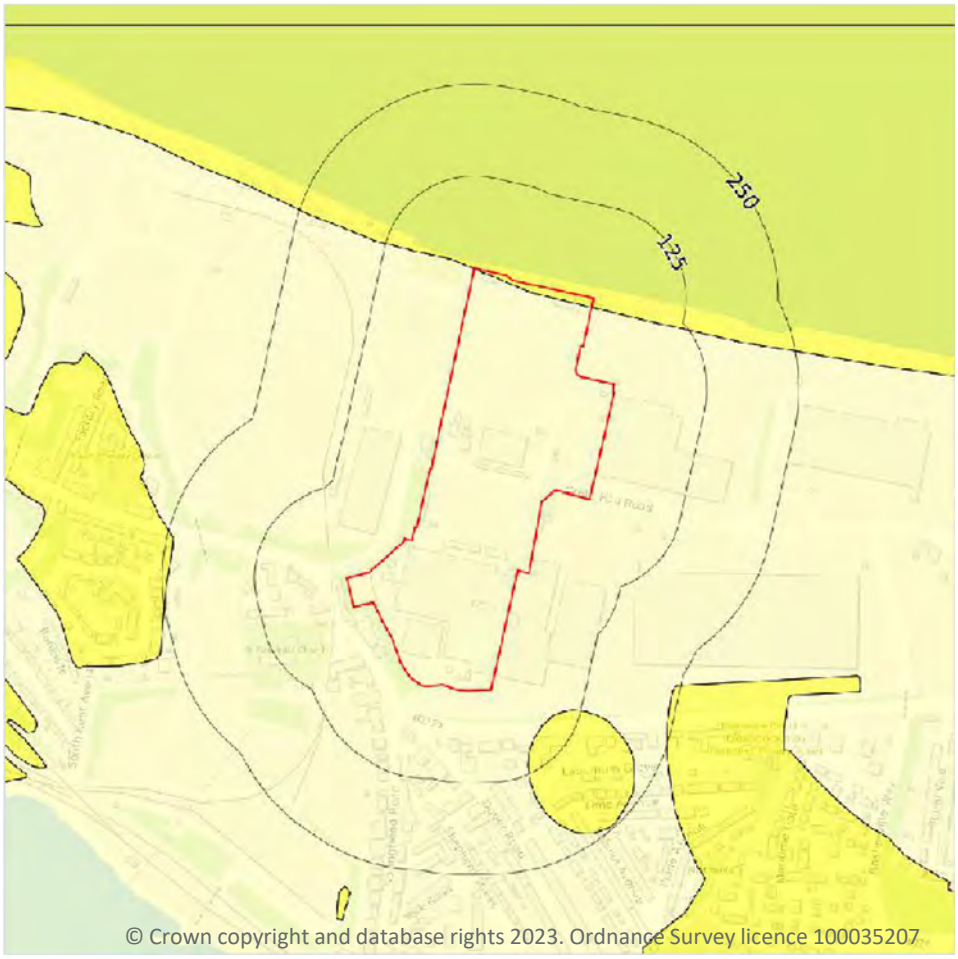
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 194 >**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	2

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

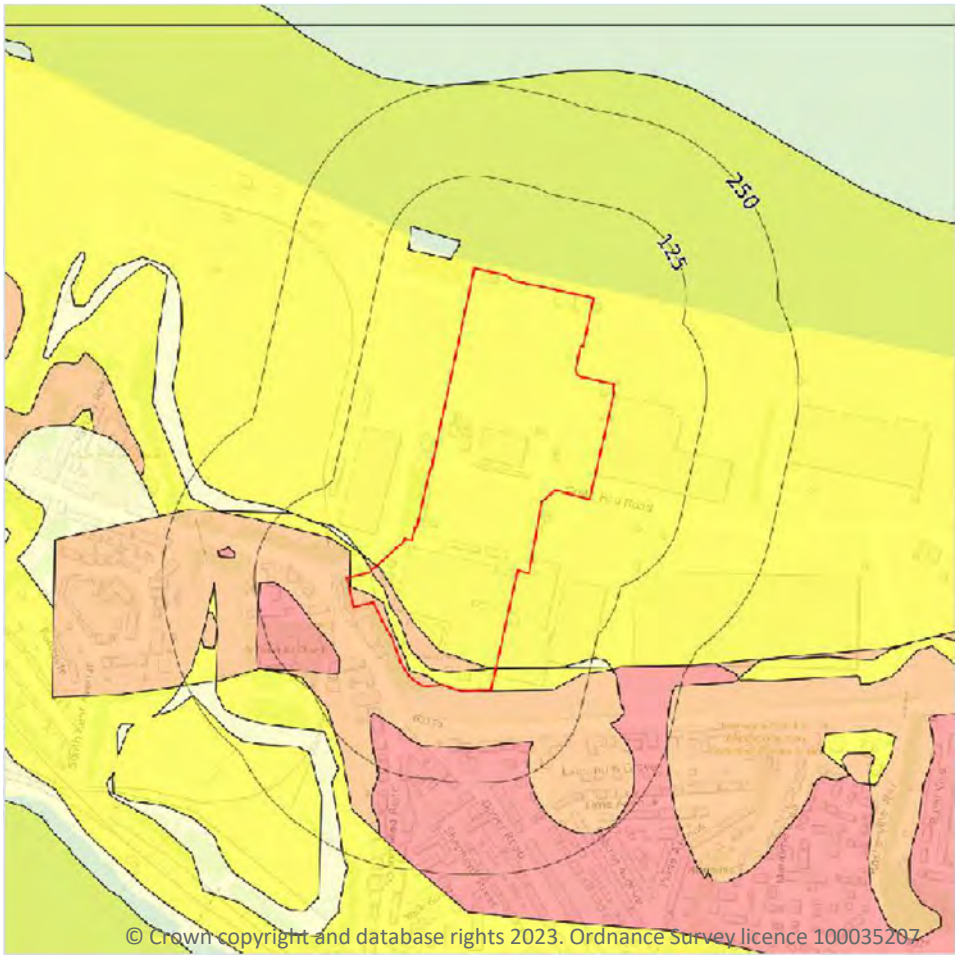
Features are displayed on the Natural ground subsidence - Landslides map on **page 195 >**

Location	Hazard rating	Details
On site	**Negligible**	**Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	5

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

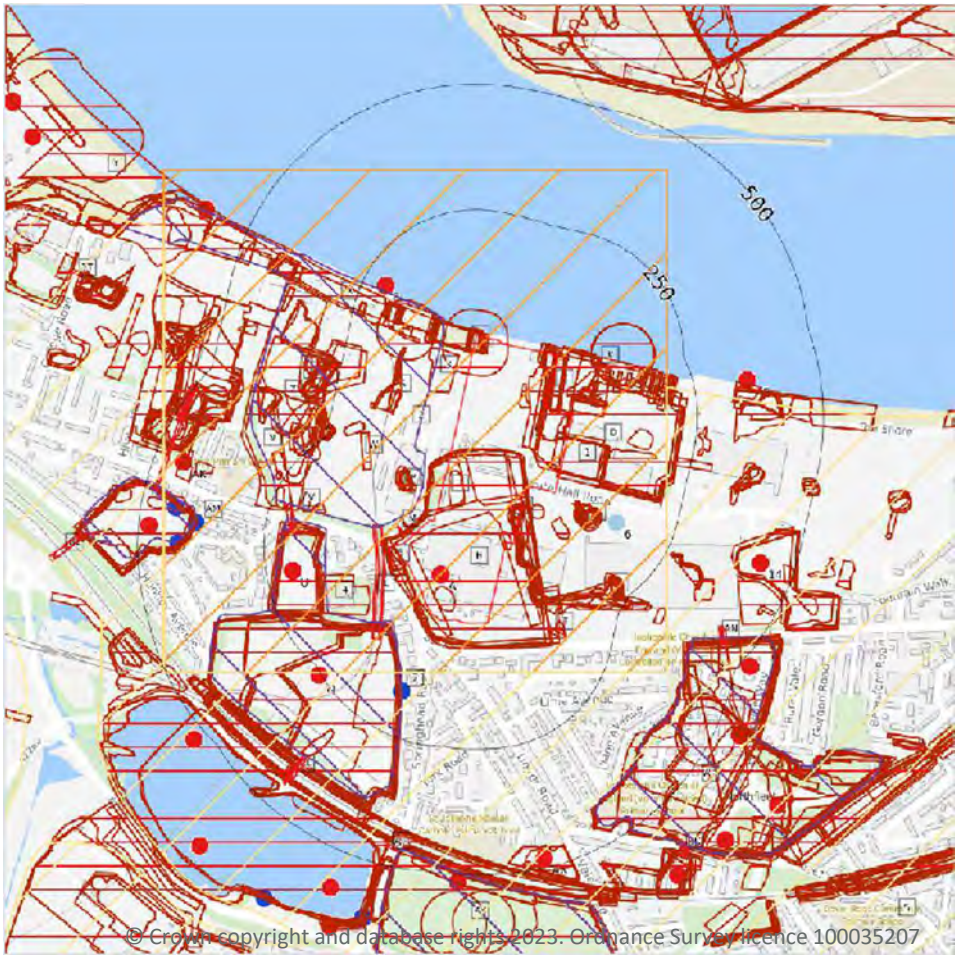
Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 197 >**

Location	Hazard rating	Details
On site	**Very low**	**Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.**

Location	Hazard rating	Details
On site	**Low**	**Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances.**
17m S	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
26m SW	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
34m N	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

BritPits

Surface ground workings

Underground workings

Historical Mineral Planning Areas

Mining Cavities

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	5

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Details	Source
7	161m S	Type: Solution Pipe x2 Superficial Geology: - Bedrock Geology: Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation	Simple Bibliography: Stantec UK Ltd (RLE Channel Tunnel Rail Link Geotechnical Feedback Report, November 2001) Full Bibliography: - Confidentiality: Data source can be revealed, data can be used freely
AM	388m W	Type: Gulls/Fissures due to Cambering x1 Superficial Geology: Boyn Hill Gravel Bedrock Geology: Thanet Formation (Sands), Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation	Simple Bibliography: Stantec UK Ltd (RLE Channel Tunnel Rail Link Geotechnical Feedback Report, November 2001) Full Bibliography: - Confidentiality: Data source can be revealed, data can be used freely
AM	388m W	Type: Solution Pipe x1 Superficial Geology: Boyn Hill Gravel Bedrock Geology: Thanet Formation (Sands), Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation	Simple Bibliography: Stantec UK Ltd (RLE Channel Tunnel Rail Link Geotechnical Feedback Report, November 2001) Full Bibliography: - Confidentiality: Data source can be revealed, data can be used freely
AM	420m W	Type: Gulls/Fissures due to Cambering x1 Superficial Geology: - Bedrock Geology: Thanet Formation (Sands), Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation	Simple Bibliography: Stantec UK Ltd (RLE Channel Tunnel Rail Link Geotechnical Feedback Report, November 2001) Full Bibliography: - Confidentiality: Data source can be revealed, data can be used freely
AM	430m W	Type: Solution Pipe x1 Superficial Geology: Boyn Hill Gravel Bedrock Geology: Thanet Formation (Sands), Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation	Simple Bibliography: Stantec UK Ltd (RLE Channel Tunnel Rail Link Geotechnical Feedback Report, November 2001) Full Bibliography: - Confidentiality: Data source can be revealed, data can be used freely

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	10

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Details	Description
A	**On site**	**Name: The Hill Brick Works** **Address: Northfleet, GRAVESEND, Kent** **Commodity: Chalk** **Status: Ceased**	**Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site** **Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority**
U	197m SW	Name: Northfleet Chalk Pit Address: Northfleet, GRAVESEND, Kent Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
8	206m NW	Name: 42 Wharf Address: NORTHFLEET, Kent Commodity: Mineral Status: Inactive	Type: Sea, river or canal wharf where mineral commodities are unloaded and stored Status description: Site which, at date of entry, is not extracting minerals, but which still has a valid planning permission to do so, and can restart at any time. May be considered Mothballed by operator.May be considered to have Active or Dormant planning permission
Q	254m SW	Name: Northfleet Chalk Pit Address: Northfleet, GRAVESEND, Kent Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AE	355m E	Name: Red Lion Wharf Address: NORTHFLEET, Kent Commodity: Crushed Rock Status: Active	Type: Sea, river or canal wharf where mineral commodities are unloaded and stored Status description: Site which is actively extracting mineral products, or in the case of wharfs and rail depots, is actively handing minerals
AE	355m E	Name: Red Lion Wharf Address: NORTHFLEET, Kent Commodity: Marine Sand & Gravel Status: Active	Type: Sea, river or canal wharf where mineral commodities are unloaded and stored Status description: Site which is actively extracting mineral products, or in the case of wharfs and rail depots, is actively handing minerals
14	430m E	Name: London Road Whiting Works Address: Northfleet, GRAVESEND, Kent Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

ID	Location	Details	Description
AK	441m W	Name: Lower Fleet Brick Field Address: Lower Northfleet, NORTHFLEET, Kent Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AM	478m W	Name: High Street Quarry Address: NORTHFLEET, Kent Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
AX	481m S	Name: Northfleet Chalk Pit Address: Northfleet, GRAVESEND, Kent Commodity: Chalk Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m **217**

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Land Use	Year of mapping	Mapping scale
1	**On site**	**Unspecified Heap**	**1916**	**1:10560**
A	**On site**	**Unspecified Heap**	**1865**	**1:10560**
B	**On site**	**Unspecified Pit**	**1977**	**1:10000**
B	**On site**	**Unspecified Pit**	**1971**	**1:10000**
B	**On site**	**Unspecified Pit**	**1966**	**1:10560**
B	**On site**	**Unspecified Pit**	**1955**	**1:10560**
C	**On site**	**Old Dock**	**1923**	**1:10560**

ID	Location	Land Use	Year of mapping	Mapping scale
C	On site	Old Dock	1907	1:10560
C	On site	Old Dock	1895	1:10560
C	On site	Dock Yard	1865	1:10560
C	On site	Unspecified Ground Workings	1955	1:10560
C	On site	Old Dock	1916	1:10560
C	On site	Old Dock	1888	1:10560
C	On site	Old Dock	1898	1:10560
C	On site	Old Dock	1898	1:10560
D	On site	Disused Dock	1923	1:10560
D	On site	Disused Dockyard	1907	1:10560
D	On site	Disused Dockyard	1895	1:10560
D	On site	Disused Dockyard	1895	1:10560
D	On site	Old Dock	1895	1:10560
D	On site	Disused Dockyard	1916	1:10560
D	On site	Disused Dockyard	1888	1:10560
D	On site	Disused Dockyard	1898	1:10560
D	On site	Disused Dockyard	1898	1:10560
E	On site	Unspecified Heap	1938	1:10560
E	On site	Unspecified Heap	1938	1:10560
E	On site	Unspecified Ground Workings	1946	1:10560
E	On site	Unspecified Heap	1895	1:10560
E	On site	Unspecified Heap	1865	1:10560
E	On site	Unspecified Heap	1938	1:10560
E	On site	Unspecified Heap	1955	1:10560
E	On site	Unspecified Ground Workings	1888	1:10560
E	On site	Unspecified Ground Workings	1898	1:10560
E	On site	Unspecified Ground Workings	1898	1:10560
F	On site	Unspecified Wharves	1938	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	**On site**	**Unspecified Wharves**	**1938**	**1:10560**
F	**On site**	**Unspecified Wharves**	**1938**	**1:10560**
F	**On site**	**Unspecified Wharves**	**1938**	**1:10560**
F	**On site**	**Unspecified Wharf**	**1865**	**1:10560**
F	**On site**	**Unspecified Wharf**	**1955**	**1:10560**
F	**On site**	**Unspecified Wharves**	**1888**	**1:10560**
F	**On site**	**Unspecified Wharves**	**1898**	**1:10560**
F	**On site**	**Unspecified Wharves**	**1898**	**1:10560**
G	**On site**	**Unspecified Ground Workings**	**1938**	**1:10560**
G	**On site**	**Unspecified Ground Workings**	**1938**	**1:10560**
G	**On site**	**Unspecified Ground Workings**	**1916**	**1:10560**
H	**On site**	**Brick Works**	**1923**	**1:10560**
H	**On site**	**Brick Works**	**1923**	**1:10560**
H	**On site**	**Brick Works**	**1907**	**1:10560**
H	**On site**	**Brick Works**	**1895**	**1:10560**
H	**On site**	**Brick Works**	**1895**	**1:10560**
H	**On site**	**Brick Works**	**1916**	**1:10560**
H	**On site**	**Brick Works**	**1888**	**1:10560**
H	**On site**	**Brick Works**	**1898**	**1:10560**
H	**On site**	**Brick Works**	**1898**	**1:10560**
I	**On site**	**Unspecified Ground Workings**	**1946**	**1:10560**
I	**On site**	**Unspecified Heap**	**1955**	**1:10560**
J	**On site**	**Unspecified Ground Workings**	**1932**	**1:10560**
C	1m NE	Cuttings	1865	1:10560
K	3m NE	Unspecified Wharf	1955	1:10560
F	6m N	Unspecified Wharf	1966	1:10560
F	8m N	Unspecified Wharves	1907	1:10560
F	11m N	Unspecified Wharves	1946	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	12m N	Unspecified Wharves	1932	1:10560
E	23m SE	Unspecified Heap	1865	1:10560
3	26m N	Unspecified Wharves	1923	1:10560
C	27m NE	Unspecified Ground Workings	1907	1:10560
C	27m NE	Unspecified Ground Workings	1895	1:10560
C	28m NE	Unspecified Ground Workings	1888	1:10560
C	31m NE	Unspecified Ground Workings	1898	1:10560
C	31m NE	Unspecified Ground Workings	1898	1:10560
C	32m NE	Unspecified Ground Workings	1895	1:10560
C	36m NE	Unspecified Ground Workings	1916	1:10560
O	42m E	Unspecified Heap	1938	1:10560
O	42m E	Unspecified Heap	1938	1:10560
O	44m E	Unspecified Ground Workings	1938	1:10560
O	44m E	Unspecified Heap	1938	1:10560
O	44m E	Unspecified Heap	1938	1:10560
O	45m E	Unspecified Ground Workings	1946	1:10560
O	45m E	Unspecified Heap	1932	1:10560
O	45m E	Unspecified Heap	1907	1:10560
O	45m E	Unspecified Heap	1895	1:10560
O	47m E	Unspecified Ground Workings	1916	1:10560
O	49m SE	Unspecified Heap	1865	1:10560
O	49m E	Unspecified Ground Workings	1898	1:10560
O	49m E	Unspecified Ground Workings	1898	1:10560
O	50m E	Unspecified Heap	1955	1:10560
P	51m W	Unspecified Heap	1888	1:10560
O	51m E	Unspecified Ground Workings	1895	1:10560
O	51m E	Unspecified Ground Workings	1865	1:10560
O	55m E	Unspecified Heap	1923	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
P	57m W	Unspecified Heap	1898	1:10560
P	57m W	Unspecified Heap	1898	1:10560
P	60m W	Unspecified Heap	1938	1:10560
P	60m W	Unspecified Heap	1938	1:10560
P	60m W	Unspecified Heap	1938	1:10560
P	61m W	Unspecified Heap	1916	1:10560
P	61m W	Unspecified Heap	1946	1:10560
P	61m W	Unspecified Heap	1932	1:10560
P	61m W	Unspecified Heap	1907	1:10560
P	61m W	Unspecified Heap	1895	1:10560
P	61m W	Unspecified Heap	1938	1:10560
P	61m W	Unspecified Heap	1938	1:10560
O	64m E	Unspecified Ground Workings	1888	1:10560
P	64m W	Unspecified Heap	1895	1:10560
J	64m S	Unspecified Heap	1955	1:10560
J	64m S	Unspecified Heap	1946	1:10560
4	65m SW	Grave Yard	1865	1:10560
K	67m NE	Unspecified Wharf	1990	1:10000
K	67m NE	Unspecified Wharf	1977	1:10000
K	67m NE	Unspecified Wharf	1971	1:10000
K	67m NE	Unspecified Wharf	1966	1:10560
J	67m S	Unspecified Heap	1938	1:10560
J	69m S	Unspecified Heap	1938	1:10560
J	69m S	Unspecified Heap	1938	1:10560
J	74m S	Unspecified Heap	1888	1:10560
F	75m N	Unspecified Wharves	1888	1:10560
F	75m N	Unspecified Wharves	1895	1:10560
F	79m N	Unspecified Wharves	1898	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	79m N	Unspecified Wharves	1898	1:10560
F	80m N	Unspecified Wharf	1955	1:10560
Q	82m SW	Chalk Pit	1938	1:10560
Q	83m SW	Unspecified Disused Pit	1990	1:10000
Q	83m SW	Unspecified Disused Pit	1977	1:10000
Q	83m SW	Burial Ground	1977	1:10000
F	83m N	Unspecified Wharves	1938	1:10560
F	83m N	Unspecified Wharves	1938	1:10560
Q	83m SW	Chalk Pit	1916	1:10560
Q	84m SW	Chalk Pit	1898	1:10560
Q	84m SW	Chalk Pit	1898	1:10560
Q	85m SW	Chalk Pit	1907	1:10560
Q	86m SW	Chalk Pit	1938	1:10560
Q	86m SW	Old Chalk Pit	1938	1:10560
Q	86m SW	Burial Ground	1966	1:10560
Q	86m SW	Burial Ground	1955	1:10560
Q	87m SW	Chalk Pit	1923	1:10560
Q	88m SW	Chalk Pit	1895	1:10560
D	88m E	Unspecified Pit	1865	1:10560
Q	89m SW	Old Chalk Pit	1946	1:10560
Q	92m SW	Chalk Pit	1895	1:10560
Q	93m SW	Old Chalk Pit	1932	1:10560
Q	99m SW	Chalk Pit	1888	1:10560
R	101m SE	Unspecified Heap	1955	1:10560
F	108m NW	Unspecified Wharves	1888	1:10560
D	118m E	Unspecified Pit	1865	1:10560
S	120m NW	Unspecified Ground Workings	1966	1:10560
S	120m NW	Unspecified Ground Workings	1955	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
S	122m NW	Unspecified Ground Workings	1932	1:10560
S	123m NW	Unspecified Heap	1938	1:10560
S	123m NW	Unspecified Heap	1938	1:10560
F	126m NW	Unspecified Wharves	1938	1:10560
F	126m NW	Unspecified Wharves	1938	1:10560
T	128m SE	Unspecified Heap	1946	1:10560
U	132m W	Old Chalk Pit	1888	1:10560
U	132m W	Old Chalk Pit	1895	1:10560
S	133m NW	Unspecified Ground Workings	1938	1:10560
S	133m NW	Unspecified Ground Workings	1938	1:10560
R	133m SE	Unspecified Ground Workings	1888	1:10560
T	134m SE	Unspecified Heap	1955	1:10560
U	135m W	Unspecified Disused Pit	1990	1:10000
U	135m W	Unspecified Disused Pit	1977	1:10000
U	135m W	Old Chalk Pit	1898	1:10560
U	135m W	Old Chalk Pit	1898	1:10560
U	137m W	Unspecified Pit	1923	1:10560
U	138m W	Unspecified Pit	1966	1:10560
U	138m W	Unspecified Pit	1955	1:10560
U	144m W	Old Chalk Pit	1895	1:10560
V	145m W	Unspecified Ground Workings	1865	1:10560
W	148m W	Unspecified Pit	1966	1:10560
W	148m W	Unspecified Pit	1955	1:10560
F	155m NW	Unspecified Wharves	1898	1:10560
F	155m NW	Unspecified Wharves	1898	1:10560
R	156m SE	Unspecified Ground Workings	1895	1:10560
F	159m NW	Unspecified Wharves	1932	1:10560
R	161m SE	Unspecified Ground Workings	1932	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	164m NW	Unspecified Wharf	1865	1:10560
W	179m W	Unspecified Heaps	1966	1:10560
W	179m W	Unspecified Heaps	1955	1:10560
X	184m NW	Unspecified Wharves	1946	1:10560
Y	189m NW	Unspecified Wharf	1895	1:10560
Z	196m W	Brick Works	1895	1:10560
R	197m SE	Unspecified Pit	1865	1:10560
N	199m NW	Brick Works	1895	1:10560
R	199m SE	Unspecified Heap	1938	1:10560
R	199m SE	Unspecified Heap	1938	1:10560
R	199m SE	Unspecified Heap	1938	1:10560
R	203m SE	Unspecified Ground Workings	1898	1:10560
R	203m SE	Unspecified Ground Workings	1898	1:10560
R	203m SE	Unspecified Heap	1946	1:10560
R	203m SE	Unspecified Heap	1895	1:10560
R	206m SE	Unspecified Heap	1907	1:10560
V	207m W	Unspecified Ground Workings	1865	1:10560
R	210m SE	Unspecified Heap	1923	1:10560
9	211m W	Unspecified Pit	1895	1:10560
Z	217m W	Gravel Pit	1966	1:10560
Z	217m W	Refuse Heap	1955	1:10560
X	227m NW	Unspecified Wharves	1938	1:10560
X	227m NW	Unspecified Wharves	1938	1:10560
X	228m NW	Unspecified Wharves	1932	1:10560
Z	234m W	Unspecified Heap	1907	1:10560
Z	234m W	Unspecified Heap	1895	1:10560
Z	237m W	Unspecified Heap	1898	1:10560
Z	237m W	Unspecified Heap	1898	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
Z	237m W	Unspecified Heap	1916	1:10560
Z	239m W	Unspecified Heap	1938	1:10560
Z	239m W	Unspecified Heap	1938	1:10560
Z	240m W	Unspecified Heap	1938	1:10560
Z	240m W	Refuse Heap	1907	1:10560
Z	242m W	Unspecified Heap	1946	1:10560
Z	242m W	Unspecified Ground Workings	1932	1:10560
Z	243m W	Unspecified Ground Workings	1938	1:10560
Z	243m W	Unspecified Ground Workings	1938	1:10560
Z	245m W	Unspecified Heap	1895	1:10560
Z	246m W	Refuse Heap	1895	1:10560
Z	246m W	Unspecified Heap	1946	1:10560
Z	249m W	Refuse Heap	1898	1:10560
Z	249m W	Refuse Heap	1898	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	**25**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Land Use	Year of mapping	Mapping scale
L	13m SW	Tunnel	1971	1:10000
L	13m SW	Tunnel	1990	1:10000
M	21m SW	Tunnels	1865	1:10560
M	22m SW	Tunnels	1865	1:10560
V	182m W	Tunnel	1971	1:10000
AL	383m SW	Tunnel	1990	1:10000

ID	Location	Land Use	Year of mapping	Mapping scale
AL	383m SW	Tunnel	1977	1:10000
AL	387m SW	Tunnel	1946	1:10560
AL	389m SW	Tunnel	1932	1:10560
AN	421m SE	Tunnel	1932	1:10560
AN	422m SE	Tunnel	1946	1:10560
AN	428m SE	Tunnel	1923	1:10560
AR	457m S	Tunnel	1946	1:10560
AK	472m W	Tunnel	1923	1:10560
AK	481m W	Tunnel	1946	1:10560
AK	483m W	Tunnel	1932	1:10560
AK	483m W	Tunnel	1907	1:10560
AK	487m W	Tunnel	1938	1:10560
BD	586m SE	Tunnel	1938	1:10560
BD	593m SE	Tunnel	1907	1:10560
BD	597m SE	Tunnel	1923	1:10560
BL	609m W	Tunnel	1971	1:10000
BL	609m W	Tunnel	1990	1:10000
BL	609m W	Tunnel	1977	1:10000
BT	792m NW	Tunnel	1923	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	**5**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
N	37m W	Northfleet	Cement	Surface mineral working	Valid	Not available
Q	76m SW	Southfleet	Chalk	Surface mineral working	Valid	Not available
AH	385m SE	Southfleet	Chalk	Surface mineral working	Valid	Not available
AM	390m W	Southfleet	Chalk	Surface mineral working	Valid	Not available
AY	463m S	Southfleet	Chalk	Surface mineral working	Valid	Not available

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Name	Commodity	Class	Likelihood
2	**On site**	**Not available**	**Chalk**	**C**	**Small scale underground mining may have occurred; mine adits, shafts and tunnels may be present. Potential for localised difficult ground conditions are at a level where they should be considered**
5	98m S	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	4

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

Features are displayed on the Mining, ground workings and natural cavities map on **page 199 >**

ID	Location	Mine Address	Mineral	Data source	Publisher
E	**On site**	**Northfleet, Kent**	**Chalk**	**-**	**-**
M	17m SW	Northfleet, Kent	Chalk	-	-
6	135m E	Northfleet, Kent	Chalk	-	-
AN	412m SE	Northfleet, Kent	Chalk	-	-

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

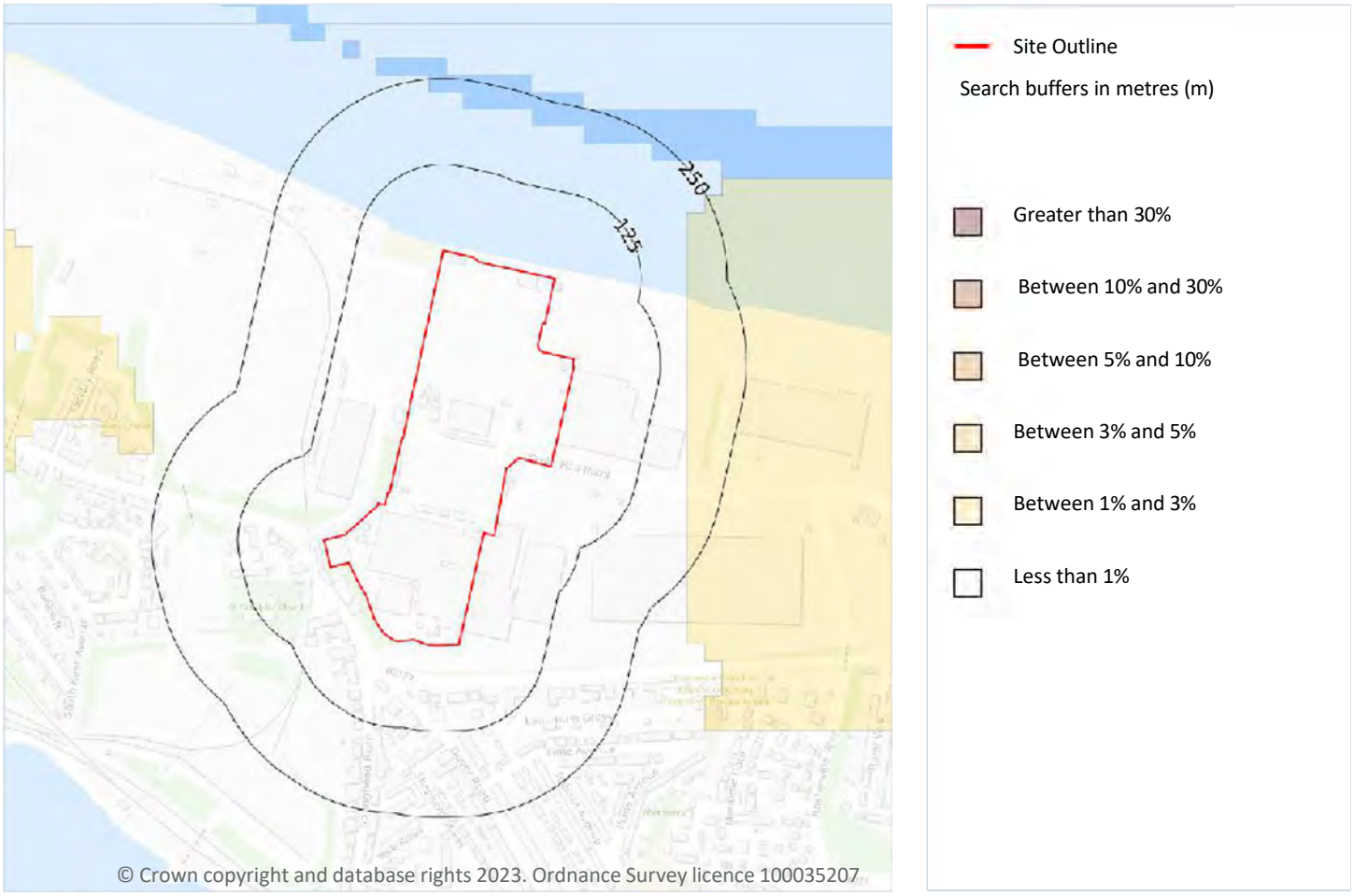
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



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19.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 215 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	5

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**200 - 300 mg/kg**	**120 - 240 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**
34m N	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

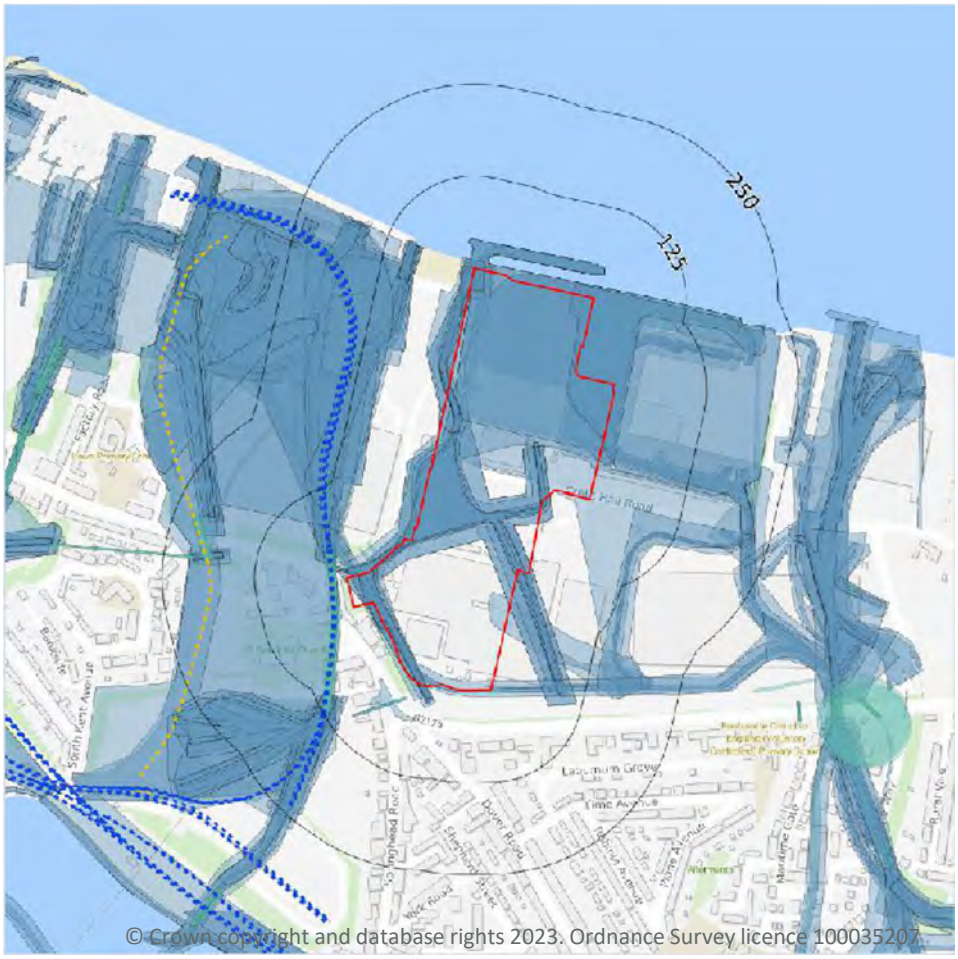
20.3 BGS Measured Urban Soil Chemistry

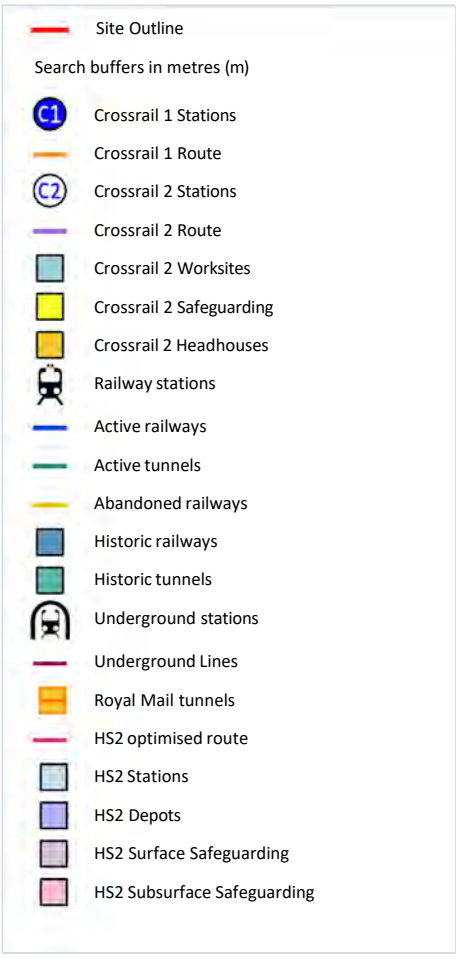
Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects





21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	1

Railway tunnels taken from contemporary Ordnance Survey mapping.

Features are displayed on the Railway infrastructure and projects map on **page 219 >**

Location	Type
21m SW	Railway Tunnel

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	132

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 219 >**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1959**	**1250**
On site	**Railway Sidings**	**1960**	**1250**
On site	**Railway Sidings**	**1973**	**1250**
On site	**Railway Sidings**	**1972**	**1250**
On site	**Railway Sidings**	**1952**	**1250**
On site	**Railway Sidings**	**1964**	**2500**
On site	**Tramway Sidings**	**1897**	**2500**
On site	**Tramway Sidings**	**1909**	**2500**
On site	**Tramway Sidings**	**1933**	**2500**
On site	**Tramway Sidings**	**1939**	**2500**
On site	**Disused Railway Sidings**	**1973**	**1250**
On site	**Mineral Railway Sidings**	**1952**	**1250**
On site	**Mineral Railway Sidings**	**1952**	**2500**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1898**	**2500**
On site	**Railway Sidings**	**1909**	**2500**
On site	**Railway Sidings**	**1938**	**10560**
On site	**Mineral Railway Sidings**	**1955**	**10560**
On site	**Mineral Railway Sidings**	**1966**	**10560**
On site	**Railway Sidings**	**1865**	**10560**
On site	**Railway Sidings**	**1907**	**10560**
On site	**Railway Sidings**	**1895**	**10560**
On site	**Railway Sidings**	**1971**	**10000**
On site	**Railway Sidings**	**1898**	**10560**
On site	**Railway Sidings**	**1888**	**10560**
On site	**Tramway Sidings**	**1923**	**10560**
On site	**Tramway Sidings**	**1946**	**10560**
On site	**Tramway Sidings**	**1938**	**10560**
On site	**Tramway Sidings**	**1932**	**10560**
On site	**Tramway Sidings**	**1916**	**10560**
On site	**Railway Sidings**	**1977**	**10000**
11m SW	Tunnels	1865	2500
12m SW	Tunnels	1865	2500
13m SW	Tunnel	1971	10000
13m SW	Railway Sidings	1971	10000
13m SW	Tunnel	1990	10000
13m SW	Railway Sidings	1990	10000
14m SW	Tunnel	1952	2500
16m SW	Tunnel	1972	1250
16m SW	Tunnel	1980	1250
16m SW	Tunnel	1994	1250
18m SW	Tunnel	1964	2500

Location	Land Use	Year of mapping	Mapping scale
18m SW	Tunnel	1952	2500
18m SW	Tunnel	1952	1250
21m SW	Tunnels	1865	10560
22m SW	Tramway Sidings	1932	10560
22m SW	Tunnels	1865	10560
23m SW	Railway Sidings	1907	10560
23m SW	Railway Sidings	1895	10560
24m S	Tunnel	1964	2500
25m S	Tunnel	1959	1250
25m S	Tunnel	1973	1250
30m SW	Tramway Sidings	1923	10560
31m SW	Railway Sidings	1888	10560
32m S	Tunnel	1993	1250
33m SW	Tramway Sidings	1946	10560
34m SW	Tramway Sidings	1897	2500
34m SW	Mineral Railway Sidings	1952	2500
36m SW	Railway Sidings	1898	10560
38m SW	Tramway Sidings	1916	10560
47m SW	Railway Sidings	1895	10560
49m SW	Tunnel	1980	1250
49m SW	Tunnel	1994	1250
50m SW	Tunnel	1972	1250
62m E	Railway Sidings	1971	10000
63m W	Railway Sidings	1977	10000
74m S	Tramway Sidings	1865	2500
82m N	Railway Sidings	1932	2500
82m N	Railway Sidings	1939	2500
82m N	Railway Sidings	1898	2500

Location	Land Use	Year of mapping	Mapping scale
83m NW	Railway Sidings	1938	10560
83m N	Railway Sidings	1938	10560
85m SW	Tramway Sidings	1907	10560
87m SE	Railway Sidings	1959	1250
89m W	Mineral Railway Sidings	1964	2500
89m SW	Tramway Sidings	1946	10560
95m SW	Railway Sidings	1895	10560
95m SW	Tramway Sidings	1938	10560
99m SW	Railway Sidings	1888	10560
99m SW	Tramway Sidings	1932	10560
100m SW	Tramway Sidings	1938	10560
101m SW	Tramway Sidings	1938	10560
102m W	Mineral Railway Sidings	1966	10560
102m SW	Railway Sidings	1898	10560
104m NW	Railway Sidings	1972	1250
105m SW	Tramway Sidings	1916	10560
107m SW	Tramway Sidings	1933	2500
107m SW	Tramway Sidings	1939	2500
108m SW	Railway Sidings	1897	2500
108m SW	Tramway Sidings	1909	2500
111m SW	Mineral Railway Sidings	1966	10560
114m SW	Tramway Sidings	1923	10560
114m NW	Railway Sidings	1952	1250
136m NW	Railway Sidings	1898	2500
137m NW	Tunnel	1964	2500
137m NW	Tunnel	1952	2500
138m NW	Tunnel	1952	1250
138m NW	Railway Sidings	1909	2500

Location	Land Use	Year of mapping	Mapping scale
159m W	Railway Sidings	1895	10560
163m W	Railway Sidings	1888	10560
164m NW	Tramway Sidings	1865	10560
170m W	Railway Sidings	1898	10560
182m SW	Mineral Railway Sidings	1952	2500
182m W	Tunnel	1971	10000
184m W	Tunnel	1980	1250
185m W	Tunnel	1972	1250
186m W	Tunnel	1865	2500
186m W	Tunnel	1994	1250
188m W	Tramway Sidings	1865	2500
190m NW	Tramway Sidings	1865	10560
193m W	Railway Sidings	1888	10560
195m NW	Railway Sidings	1898	2500
195m NW	Railway Sidings	1909	2500
196m NE	Railway Sidings	1965	1250
196m NE	Railway Sidings	1952	1250
198m W	Railway Sidings	1898	10560
198m NW	Tramway Sidings	1897	2500
198m NW	Tramway Sidings	1909	2500
200m W	Tramway Sidings	1897	2500
203m W	Railway Sidings	1895	10560
205m W	Tunnel	1952	1250
205m W	Tunnel	1952	2500
206m W	Tunnel	1964	2500
223m E	Railway Sidings	1865	10560
227m E	Railway Sidings	1907	10560
229m W	Railway Sidings	1952	1250

Location	Land Use	Year of mapping	Mapping scale
229m NW	Railway Sidings	1938	10560
229m NW	Railway Sidings	1938	10560
229m NW	Railway Sidings	1916	10560
230m NW	Railway Sidings	1909	2500
231m E	Tramway Sidings	1865	2500
234m E	Railway Sidings	1916	10560
243m E	Tramway Sidings	1909	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	3

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 219 >**

Location	Description
184m W	Dismantled
190m W	Dismantled
223m W	Abandoned

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	11

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 219 >**

Location	Name	Type
19m SW	Northfleet freight link	rail
22m SW	Northfleet freight link	rail
47m SW	Northfleet freight link	rail
48m SW	Not given	Multi Track
48m SW	Northfleet freight link	rail
54m W	Northfleet freight link	rail
89m W	Northfleet freight link	rail
124m SW	Northfleet freight link	rail
125m SW	Not given	Single Track
125m SW	Not given	Single Track
127m SW	Northfleet freight link	rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

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Appendix D

Detailed Unexploded Ordnance (UXO) Risk Assessment Report

1ST LINE DEFENCE

Detailed Unexploded Ordnance (UXO) Risk Assessment

Project Name	Northfleet, Gravesend, Kent
Client	GVR Geoservices Ltd
Site Address	Northfleet, Gravesend, Kent, DA11 9AD
Report Reference	DA11104a-00
Date	19/05/23
Authored by	CJ
Revised by	HJ
Final Check	AT

Executive Summary

Site Location and Description

The site is located in Northfleet, in the borough of Gresham, Kent.

The site comprises a large section of an industrial and commercial wharf area, located on the south side of the Thames estuary. Within the southern section is several large industrial and commercial warehouse structures of the former Kimberley-Clark Factory and associated hard ground. The northern section of the site comprises partially of a large warehouse structure, various smaller industrial structures, associated hard-ground, and wharf structures adjacent to the Thames River.

The site is bordered to the north by the remainder of a wharf adjacent to the Thames River, to the east by a combination of commercial structures, warehouses and hard-ground, including roadways and car parking space. To the south the site is bound by foliage and hard standing car parking space adjacent to London Road, and to the west by Granby Road and associated foliage and shrubbery.

The site is approximately centred on the OS grid reference: **TQ 62680 74392**.

Proposed Works

The client is undertaking a Phase 1 Geoenvironmental Desk Study to ascertain the historical and current land use history of the Northfleet Kimberley Clark Papermill site and the potential for ground and groundwater contamination at the site. The desk study is a non-intrusive geoenvironmental assessment not requiring site works.

Geology and Bomb Penetration Depth

The British Geological Survey (BGS) map shows the bedrock geology of the site to comprise Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) - Chalk. Sedimentary Bedrock formed approximately 72 to 94 million years ago in the Cretaceous Period.

Site-specific geotechnical information was not available to 1st Line Defence at the time of the production of this report. An assessment of maximum bomb penetration depth can be made once such data becomes available, or by a UXO specialist during on-site support.

It should be noted that the maximum depth that a bomb could reach may vary across a site and will be largely dependent on the specific underlying geological strata and its density.

UXO Risk Assessment

1st Line Defence has assessed that there is a **Low-Medium Risk** from items of German air delivered UXO across the site. This assessment is based on the following factors:

- During WWII the site was located within the Urban District of Northfleet, which sustained an overall high density of bombing with an average of 103.2 items of ordnance falling per 1,000 acres according to official Home Office bombing statistics. This was mainly due to the industrial capacity of the town and its position on the River Thames, with numerous factories and commercial ports located along the harbour area
- Kent Daily Bomb Mapping records numerous bomb incidents within the Northfleet area, although the mapping was recorded on small scale maps and thus it is not possible to determine the exact locations of individual bomb strikes, beyond establishing the approximate locality of the incidents.
- Northfleet and Medway Group War Diary written records record several bomb incidents within the vicinity of the site, most notably at the location of the Paper Mills directly north-east of the site.. No bomb incidents are recorded directly within the site boundary, although there are no major structures within the site boundary from which to identify the location of a bomb strike.
- Anecdotal evidence corroborates these written records, confirming Bowater Paper Mill did indeed suffer several bomb strikes.
- WWII-era aerial photography of the site from 1944 shows no obvious indications of bomb damage such as craters, or ground disturbances in the undeveloped portions of the site. The housing, situated in the south-eastern section of the site, also appears externally intact and undamaged. There is evidence of bomb damage in the vicinity of the site, and roofing repairs can be observed on the Paper Mills factory to the north-east of the site- see **Annex M2**.

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UXO Risk Assessment

- The south of the site is not considered to have had ground cover conducive to the detection of UXO as it was occupied by predominantly undeveloped ground. UXO entry holes, which could be as small as 20cm in diameter and could have easily been obscured by the vegetation present within the site and its surrounds. The ground cover in the north of the site is considered to have been more conducive to the detection of UXO. This is because the site comprised of more developed land, including landscaped allotments, small structures and roadways
- The access frequency of access to the site is not considered to have been homogenous. The southern section of the site, comprising of predominantly undeveloped ground, is considered to have experienced a low degree of access, owing to the lack of structures. The northern section of the site is considered to have experienced a higher degree of access, due to the presence of on-site structures and roadways, and the proximity of the nearby Paper Mills factory. How often the allotment gardens in this area were accessed is wholly dependent upon how often each owner visited their allotment garden. The south-eastern section of the site was occupied by residential housing. It appears that the housing survived the war structurally intact. Therefore, it is thought likely that residents would have continued to live there and therefore conduct post-raid checks, for evidence of UXO. Generally, more frequent access increases the likelihood UXO could go noticed and reported
- To summarise, no positive evidence of on-site bomb strikes or bomb damage could be found. However, there is evidence of bomb strikes and bomb damage to roads and structures within the wider vicinity of the site, particularly in relation to the nearby former Bowater Paper Mill factory. Subsequently, although the evidence available does not indicate the UXO risk on site to be significantly elevated above the 'background level' of risk for Gravesend, the risk from UXO cannot be entirely discounted and has been designed as **Low-Medium**. As a result of this risk level, it is recommended that a UXO risk management plan is in place prior to intrusive works taking place and that any staff undertaking such works receive UXO awareness briefings.
-

The Risk from Allied UXO

- Anecdotal evidence sourced online suggests that the Bowater Paper Mills, situated immediately east of the northern section of the site, may have been requisitioned during the war for the production of weaponry. It has not been possible to completely verify the information, but is it considered likely that this would have involved the large-scale use and storage of explosives, as the available evidence indicates that the factory was used to build the components of weapons. The factory was also outside the site boundary. This factor is thus not considered to have any significant impact on the risk of Allied UXO contamination on-site.
- There is no evidence that the site formerly had any military occupation or usage that could have led to contamination with items of Allied ordnance, such as LSA and SAA. The conditions in which HAA or LAA projectiles may have fallen unnoticed within the site boundary are however analogous to those regarding aerial delivered ordnance.

Post-WWII Redevelopment

- The site has been significantly redeveloped post-war. Historical OS mapping and current satellite imagery indicates that a large area of industrial structures and associated hard-ground has been developed on the previously mostly undeveloped land within the site boundary, which has subsequently been redeveloped. 1st Line Defence has found no evidence to suggest that any items of UXO were encountered during these prior post-war works on site.
- The risk of UXO remaining is considered to be mitigated at the location of and down to the depth of any post-war redevelopment on site. For example, the risk from deep buried UXO will only have been mitigated within the volumes of any post-war pile foundations or deep excavations for basement levels. The risk will however remain within virgin geology below and amongst these post-war works, down to the maximum bomb penetration depth.

Recommended Risk Mitigation Measures

The following risk mitigation measures are recommended to support the proposed works at the Northfleet site:

All Works

- UXO Risk Management Plan
- Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.

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Glossary

Abbreviation	Definition
AA	Anti-Aircraft
AFS	Auxiliary Fire Service
AP	Anti-Personnel
ARP	Air Raid Precautions
DA	Delay-action
EOC	Explosive Ordnance Clearance
EOD	Explosive Ordnance Disposal
FP	Fire Pot
GM	G Mine (Parachute mine)
HAA	Heavy Anti-Aircraft
HE	High Explosive
IB	Incendiary Bomb
JSEODOC	Joint Services Explosive Ordnance Disposal Operation Centre
LAA	Light Anti-Aircraft
LCC	London County Council
LRRB	Long Range Rocket Bomb (V-2)
LSA	Land Service Ammunition
NFF	National Filling Factory
OB	Oil Bomb
PAC	Pilotless Aircraft (V-1)
PB	Phosphorous Bomb
PM	Parachute Mine
POW	Prisoner Of War
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RFC	Royal Flying Corps
RNAS	Royal Naval Air Service
ROF	Royal Ordnance Factory
SA	Small Arms
SAA	Small Arms Ammunition
SD2	Anti-personnel "Butterfly Bomb"
SIP	Self-Igniting Phosphorous
U/C	Unclassified bomb
UP	Unrotated Projectile (rocket)
USAAF	United States Army Air Force
UX	Unexploded
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	Flying Bomb (Doodlebug)
V-2	Long Range Rocket
WAAF	Women's Auxiliary Air Force
X	Exploded

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Detailed Unexploded Ordnance (UXO) Risk Assessment

Site: Northfleet, Gravesend, Kent
Client: GVR Geoservices Ltd

1. Introduction

1.1. Background

1st Line Defence has been commissioned by GVR Geoservices Ltd to conduct a Detailed Unexploded Ordnance (UXO) Risk Assessment for the works proposed at Northfleet, Gravesend, Kent.

Buried UXO can present a significant risk to construction works and development projects. The discovery of a suspect device during works can cause considerable disruption to operations as well as cause unwanted delays and expense.

UXO in the UK can originate from three principal sources:

1. Munitions resulting from wartime activities including German bombing in WWI and WWII, long range shelling, and defensive activities.
2. Munitions deposited as a result of military training and exercises.
3. Munitions lost, burnt, buried or otherwise discarded either deliberately, accidentally, or ineffectively.

This report will assess the potential factors that may contribute to the risk of UXO contamination. If an elevated risk is identified at the site, this report will recommend appropriate mitigation measures, in order to reduce the risk to as low as is reasonably practicable. Detailed analysis and evidence will be provided to ensure an understanding of the basis for the assessed risk level and any recommendations.

This report complies with the guidelines outlined in *CIRIA C681*, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'

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2. Method Statement

2.1. Report Objectives

The aim of this report is to conduct a comprehensive assessment of the potential risk from UXO at Northfleet, Gravesend, Kent. The report will also recommend appropriate site and work-specific risk mitigation measures to reduce the risk from explosive ordnance during the envisaged works to a level that is as low as reasonably practicable.

2.2. Risk Assessment Process

1st Line Defence has undertaken a five-step process for assessing the risk of UXO contamination:

1. The likelihood that the site was contaminated with UXO.
2. The likelihood that UXO remains on the site.
3. The likelihood that UXO may be encountered during the proposed works.
4. The likelihood that UXO may be initiated.
5. The consequences of initiating or encountering UXO.

In order to address the above, 1st Line Defence has taken into consideration the following factors:

- Evidence of WWI and WWII German air delivered bombing as well as the legacy of Allied occupation.
- The nature and conditions of the site during WWII.
- The extent of post-war development and UXO clearance operations on site.
- The scope and nature of the proposed works and the maximum assessed bomb penetration depth.
- The nature of ordnance that may have contaminated the proposed site area.

2.3. Sources of Information

Every reasonable effort has been made to ensure that relevant evidence has been consulted and presented in order to produce a thorough and comprehensible report for the client. To achieve this the following, which includes military records and archive material held in the public domain, have been accessed:

- The National Archives and Kent History and Library Centre.
- Historical mapping datasets.
- Historic England National Monuments Record.
- Relevant information supplied GVR Geoservices Ltd.
- Available material from 33 Engineer Regiment (EOD) Archive (part of 29 Explosive Ordnance and Disposal and Search Group).
- 1st Line Defence's extensive historical archives, library and UXO geo-datasets.
- Open sources such as published books and internet resources.

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3. Background to Bombing Records

3.1. General Considerations of Historical Research

This desktop assessment is based largely upon analysis of historical evidence. Every reasonable effort has been made to locate and present significant and pertinent information. 1st Line Defence cannot be held accountable for any changes to the assessed risk level or risk mitigation measures, based on documentation or other data that may come to light at a later date, or which was not available to 1st Line Defence during the production of this report.

It is often problematic and sometimes impossible to verify the completeness and accuracy of WWII-era records. As a consequence, conclusions as to the exact location and nature of a UXO risk can rarely be quantified and are, to a degree, subjective. To counter this, a range of sources have been consulted, presented and analysed. The same methodology is applied to each report during the risk assessment process. 1st Line Defence cannot be held responsible for any inaccuracies or the incompleteness in available historical information.

3.2. German Bombing Records

During WWII, bombing records were generally gathered locally by the police, Air Raid Precaution (ARP) wardens and military personnel. These records typically contained information such as the date, the location, the amount of damage caused and the types of bombs that had fallen during an air raid. This information was made either through direct observation or post-raid surveys. The Ministry of Home Security Bomb Census Organisation would then receive this information, which was plotted onto maps, charts, and tracing sheets by regional technical officers. The collective record set (regional bomb census mapping and locally gathered incidents records) would then be processed and summarised into reports by the Ministry of Home Security Research and Experiments Branch. The latter were tasked with providing the government 'a complete picture of air raid patterns, types of weapons used and damage caused- in particular to strategic services and installations such as railways, shipyards, factories and public utilities.'[1]

The quality, detail and nature of record keeping could vary considerably between provincial towns, boroughs and cities. No two areas identically collated or recorded data. While some local authorities maintained records with a methodical approach, sources in certain areas can be considerably more vague, dispersed, and narrower in scope. In addition, the immediate priority was mostly focused on assisting casualties and minimising damage at the time. As a result, some records can be incomplete and contradictory. Furthermore, many records were even damaged or destroyed in subsequent air raids. Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are therefore not always reliable. Whereas records of attacks on military or strategic targets were often maintained separately and have not always survived.

3.3. Allied Records

During WWII, considerable areas of land were requisitioned by the War Office for the purpose of defence, training, munitions production and the construction of airfields. Records relating to military features vary and some may remain censored. Within urban environments datasets will be consulted detailing the location of munition production as well as wartime air and land defences. In rural locations it may be possible to obtain plans of military establishments, such as airfields, as well as training logs, record books, plans and personal memoirs. As with bombing records, every reasonable effort will be made to access records of, and ascertain any evidence of, military land use. However, there are occasions where such evidence is not available, as records may not be accessible, have been lost/destroyed, or simply were not kept in the first place.

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[1] http://www.nationalarchives.gov.uk/help-with-your-research/research-guides/bomb-census-survey-records-1940-1945/.

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4. UK Regulatory Environment and Guidelines

4.1. General

There is no formal obligation requiring a UXO risk assessment to be undertaken for construction projects in the UK, nor is there any specific legislation stipulating the management or mitigation of UXO risk. However, it is implicit in the legislation outlined below that those responsible for intrusive works (archaeology, site investigation, drilling, piling, excavation etc.) should undertake a comprehensive and robust assessment of the potential risks to employees and that mitigation measures are implemented to address any identified hazards.

4.2. CDM Regulations 2015

The Construction (Design and Management) Regulations 2015 (CDM 2015) define the responsibilities of parties involved in the construction of temporary or permanent structures.

The CDM 2015 establishes a duty of care extending from clients, principle designers, and contractors to those working on, or affected by, a project. Those responsible for construction projects may therefore be accountable for the personal or proprietary loss of third parties, if correct health and safety procedure has not been applied.

Although the CDM does not specifically reference UXO, the risk presented by such items is both within the scope and purpose of the legislation. It is therefore implied that there is an obligation for parties to:

- Provide an appropriate assessment of potential UXO risks at the site (or ensure such an assessment is completed by others).
- Put in place appropriate risk mitigation measures if necessary.
- Supply all parties with information relevant to the risks presented by the project.
- Ensure the preparation of a suitably robust emergency response plan.

4.3. The 1974 Health and Safety at Work etc. Act

All employers have a responsibility under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, to ensure the health and safety of their employees and third parties, so far as is reasonably practicable and conduct suitable and sufficient risk assessments.

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4.4. CIRIA C681

In 2009, the Construction Industry Research and Information Association (CIRIA) produced a guide to the risk posed by UXO to the UK construction industry (CIRIA C681). CIRIA is a neutral, independent and not-for-profit body, linking organisations with common interests and facilitating a range of collaborative activities that help improve the industry.

The publication provides the UK construction industry with a defined process for the management of risks associated with UXO from WWI and WWII air bombardment. It is also broadly applicable to the risks from other forms of UXO that might be encountered. It focuses on construction professionals' needs, particularly if there is a suspected item of UXO on site, and covers issues such as what to expect from a UXO specialist. The guidance also helps clients to fulfil their legal duty under CDM 2015 to provide designers and contractors with project specific health and safety information needed to identify hazards and risks associated with the design and construction work. This report conforms to this CIRIA guidance and to the various recommendations for good practice referenced therein. It is recommended that this document is acquired and studied where possible to allow a better understanding of the background to both the risk assessment process and the UXO issue in the UK in general.

4.5. Additional Legislation

In the event of a casualty resulting from the failure of an employer/client to address the risks relating to UXO, the organisation may be criminally liable under the Corporate Manslaughter and Corporate Homicide Act 2007.

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5. The Role of Commercial UXO Contractors and The Authorities

5.1. Commercial UXO Specialists

The role of a UXO Specialist (often referred to as UXO Consultant or UXO Contractor) such as 1st Line Defence, is defined in CIRIA C681 as the provision of expert knowledge and guidance to the client on the most appropriate and cost-effective approach to UXO risk management at a site.

The principal role of UXO Specialists is to provide the client with an appropriate assessment of the risk posed by UXO for a specific project, and identify and carry out suitable methodology for the mitigation of any identified risks to reduce them to an acceptable level.

The requirement for a UXO Specialist should ideally be identified in the initial stages of a project, and it is recommended that this occur prior to the start of any detailed design. This will enable the client to budget for expenditure that may be required to address the risks from UXO, and may enable the project team to identify appropriate techniques to eliminate or reduce potential risks through considered design, without the need for UXO specific mitigation measures. The UXO Specialist should have suitable qualifications, levels of competency and insurances.

Please note 1st Line Defence has the capability to provide a complete range of required UXO risk mitigation services, in order to reduce a risk to as low as reasonably practicable. This can involve the provision of both ground investigation, and where appropriate, UXO clearance services.

5.2. The Authorities

The police have a responsibility to co-ordinate the emergency services in the event of an ordnance-related incident at a construction site. Upon inspection they may impose a safety cordon, order an evacuation, and call the military authorities Joint Services Explosive Ordnance Disposal Operation Centre (JSEODOC) to arrange for investigation and/or disposal. Within the Metropolitan Police Operational Area, SO15 EOD will be tasked to any discovery of suspected UXO. The request for Explosive Officer (Expo) support is well understood and practiced by all Metropolitan Boroughs. The requirement for any additional assets will then be coordinated by the Expo if required.

In the absence of a UXO specialist, police officers will usually employ such precautionary safety measures, thereby causing works to cease, and possibly requiring the evacuation of neighbouring businesses and properties.

The priority given to the police request will depend on the EOD teams' judgement of the nature of the UXO risk, the location, people and assets at risk, as well as the availability of resources. The speed of response varies; authorities may respond immediately or in some cases it may take several days for the item of ordnance to be dealt with. Depending on the on-site risk assessment the item of ordnance may be removed from the site and/or destroyed by a controlled explosion.

Following the removal of an item of UXO, the military authorities will only undertake further investigations or clearances in high-risk situations. If there are regular UXO finds on a site the JSEODOC may not treat each occurrence as an emergency and will recommend the construction company puts in place alternative procedures, such as the appointment of a commercial contractor to manage the situation.

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6. The Site

6.1. Site Location

The site is located in Northfleet, in the borough of Gresham, Kent.

The site is bordered to the north by the remainder of a wharf adjacent to the Thames River, to the east by a combination of commercial structures, warehouses and hard-ground, including roadways and car parking space. To the south the site is bound by foliage and hard standing car parking space adjacent to London Road, and to the west by Granby Road and associated foliage and shrubbery.

The site is approximately centred on the OS grid reference: **TQ 62680 74392**.

Site location maps are presented in **Annex A**.

6.2. Site Description

The site comprises a large section of an industrial and commercial wharf area, located on the south side of the Thames estuary. Within the southern section is several large industrial and commercial warehouse structures of the former Kimberley-Clark Factory and associated hard ground. The northern section of the site comprises partially of a large warehouse structure, various smaller industrial structures, associated hard-ground, and wharf structures adjacent to the Thames River.

A recent aerial photograph and site plan are presented in **Annex B** and **Annex C** respectively.

7. Scope of the Proposed Works

7.1. General

The client is undertaking a Phase 1 Geoenvironmental Desk Study to ascertain the historical and current land use history of the Northfleet Kimberley Clark Papermill site and the potential for ground and groundwater contamination at the site. The desk study is a non-intrusive geoenvironmental assessment not requiring site works.

8. Ground Conditions

8.1. General Geology

The British Geological Survey (BGS) map shows the bedrock geology of the site to comprise Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) - Chalk. Sedimentary Bedrock formed approximately 72 to 94 million years ago in the Cretaceous Period.

8.2. Site-Specific Geology

Whilst geotechnical data was provided by GVR Geoservices Ltd, owing to this information relating to an area beyond the site boundary, it is not considered relevant for an assessment of the precise conditions on site.

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9. Site History

9.1. Introduction

The purpose of this section is to identify the composition of the site pre and post-WWII. It is important to establish the historical use of the site, as this may indicate the site's relation to potential sources of UXO as well as help with determining factors such as the land use, groundcover, likely frequency of access and signs of bomb damage.

9.2. Ordnance Survey Historical Maps

Relevant historical maps were obtained for this report and are presented in **Annex D.** See below for a summary of the site history shown on acquired mapping.

Pre-WWII		
Date	**Scale**	**Description**
1939	1:2,500	Pre-WWII OS mapping indicates the south of the site is occupied mainly by a large area of undeveloped land, labelled as Callybank. Individual rectangular plots of land are situated in the western part of this section, whilst a row of terraced houses is partially included within the eastern boundary. A Tramway line also intersects this section along the eastern and southern boundaries. The northern section of the site comprises more landscaped land, labelled as allotment gardens, and various small structures associated with the docklands area. Several small roadways and paths intersect this section, whilst the very northern section of the site comprises sediment adjacent to the Thames River. To the immediate north-east of the site boundary is a large industrial Paper Mill, structure. According to historical sources this stricture, known as The Bowater Paper Mill, was established in 1914 and then expanded to include the site boundary by 1960. The Paper Mill was closed down in 1972. To the south lies London Road, to the west Granby Road, and to the north the Thames River.

Post-WWII		
Date	**Scale**	**Description**
1946	1:10,560	Post-WWII OS mapping of a slightly lower quality shows no major structural developments occurred within the site boundary or its immediate vicinity during the war.
1967	1:2,500	Post-WWII OS mapping from a later date shows major structural developments have occurred on-site. The Paper Mill factory to the north-east of the site has expanded to include the land encompassing the site. Various industrial structures are now included within the site boundary and its vicinity.

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9.3. Pre-WWII Photography of the Site

Pre-WWII aerial photography has been obtained from the Aerofilms collection available from *Britain From Above*. This imagery is presented in **Annex E**. See below for a description:

Title of Photograph	Comments
August 1932	The oblique image partially covering the site corroborates the layout of the site presents in historical OS mapping. The northern section can clearly been seen to comprise landscaped allotments, whilst the southern section of the site appears entirely undeveloped. The large Bowater Paper Mill can be observed immediately west of the site.
12th May 1939	This oblique covering the entire site from a later date again corroborates the layout of the site presented in historical OS mapping.

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10. Introduction to German Air Delivered Ordnance

10.1. General

During WWI and WWII, the UK was subjected to bombing which often resulted in extensive damage to city centres, docks, rail infrastructure and industrial areas. The poor accuracy of WWII targeting technology and the nature of bombing techniques often resulted in neighbouring areas to targets sustaining collateral damage.

In addition to raids which concentrated on specific targets, indiscriminate bombing of large areas also took place. This occurred most prominently in the London 'Blitz', though affected many other towns and cities. As discussed in the following sections, a proportion of the bombs dropped on the UK did not detonate as designed. Although extensive efforts were made to locate and deal with these UXBs at the time, many still remain buried and can present a potential risk to construction projects.

The main focus of research for this section of the report will concern German air delivered ordnance dropped during WWII, although WWI bombing will also be considered.

10.2. Generic Types of WWII German Air Delivered Ordnance

To provide an informed assessment of the hazards posed by any items of unexploded ordnance that may remain in situ on site, the table below provides information on the types of German air delivered ordnance most commonly used by the Luftwaffe during WWII. Images and brief summaries of the characteristics of these items of ordnance are listed in **Appendices i-iii**.

Generic Types of WWII German Air Delivered Ordnance		
Type	**Frequency**	**Likelihood of detection**
High Explosive (HE) bombs	In terms of weight of ordnance dropped, HE bombs were the most frequently deployed by the Luftwaffe during WWII.	Although efforts were made to identify the presence of unexploded ordnance following an air raid, often the damage and destruction caused by detonated bombs made observation of UXB entry holes impossible. The entry hole of an unexploded bomb can be as little as 20cm in diameter and was easily overlooked in certain ground conditions (see **Annex F**). Furthermore, ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded smaller bomb. UXBs therefore present the greatest risk to present–day intrusive works.
1kg Incendiary bombs (IB)	In terms of the number of weapons dropped, small IBs were the most numerous. Millions of these were dropped throughout WWII.	IBs had very limited penetration capability and in urban areas would often have been located in post-raid surveys. If they failed to initiate and fell in water, on soft vegetated ground, or bombed rubble, they could easily go unnoticed.
Large Incendiary bombs (IB)	These were not as common as the 1kg IBs, although they were more frequently deployed than PMs and AP bomblets.	If large IBs did penetrate the ground, complete combustion did not always occur and in such cases they could remain a risk to intrusive works.
Aerial or Parachute mines (PM)	These were deployed less frequently than HE and IBs due to size, cost and the difficulty of deployment.	If functioning correctly, PMs would generally have had a slow rate of descent and were very unlikely to have penetrated the ground. Where the parachute failed, mines would have simply shattered on impact if the main charge failed to explode. There have been extreme cases when these items have been found unexploded. However, in these scenarios, the ground was either extremely soft or the munition fell into water.
Anti-personnel (AP) bomblets	These were not commonly used and are generally considered to pose a low risk to most works in the UK.	SD2 bomblets were packed into containers holding between 6 and 108 submunitions. They had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.

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10.3. Failure Rate of German Air Delivered Ordnance

It has been estimated that 10% of WWII German air delivered HE bombs failed to explode as designed. Reasons for why such weapons might have failed to function as designed include:

- Malfunction of the fuze or gain mechanism (manufacturing fault, sabotage by forced labour or faulty installation).
- Many were fitted with a clockwork mechanism that could become immobilised on impact.
- Failure of the bomber aircraft to arm the bombs due to human error or an equipment defect.
- Jettisoning the bomb before it was armed or from a very low altitude. This most likely occurred if the bomber aircraft was under attack or crashing.

From 1940 to 1945, bomb disposal teams reportedly dealt with a total of 50,000 explosive items of 50kg, over 7,000 anti-aircraft projectiles and 300,000 beach mines. Unexploded ordnance is still regularly encountered across the UK, see press articles in **Annex G**.

10.4. UXB Ground Penetration

An important consideration when assessing the risk from a UXB is the likely maximum depth of burial. There are several factors which determine the depth that an unexploded bomb will penetrate:

- Mass and shape of bomb.
- Height of release.
- Velocity and angle of bomb.
- Nature of the ground cover.
- Underlying geology.

Geology is perhaps the most important variable. If the ground is soft, there is a greater potential of deeper penetration. For example, peat and alluvium are easier to penetrate than gravel and sand, whereas layers of hard strata will significantly retard and may stop the trajectory of a UXB.

10.4.1. The J-Curve Effect Principle

J-curve is the term used to describe the characteristic curve commonly followed by an air delivered bomb dropped from height after it penetrates the ground. Typically, as the bomb is slowed by its passage through underlying soils, its trajectory curves towards the surface. Many UXBs are found with their nose cone pointing upwards as a result of this effect. More importantly, however, is the resulting horizontal offset from the point of entry. This is typically a distance of about one third of the bomb's penetration depth, but can be higher in certain conditions (see **Annex F**).

10.4.2. WWII UXB Ground Penetration Studies

During WWII the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by bomb disposal (BD) teams. Conclusions were drawn predicting the likely average and maximum depths of penetration of different sized bombs in different geological strata.

For example, the largest common German bomb (500kg) had a likely concluded penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1,000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

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10.4.3. Site Specific Bomb Penetration Considerations

When considering an assessment of the bomb penetration at the site of proposed works the following parameters should be used:

- WWII geology – Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation.
- Impact angle and velocity – 10-15° from vertical and 270 metres per second.
- Bomb mass and configuration – The 500kg SC HE bomb, without retarder units or armour piercing nose (this was the largest of the common bombs used against Britain).

It has not been possible to determine maximum bomb penetration capabilities at this stage due to the limitations of site-specific geotechnical information provided for the purpose of this report. An assessment can be made once further information becomes available or by an UXO Specialist on-site.

10.5. V-Weapons

Hitler's 'V-weapon' campaign began from mid-1944. It used newly developed unmanned cruise missiles and rockets. The V-1, known as the flying bomb or pilotless aircraft, and the V-2, a long range rocket, were launched from bases in Germany and occupied Europe. A total of 9,251 V-1s and 1,115 V-2s were recorded in the United Kingdom.

Although these weapons caused considerable damage, their relatively low numbers allowed accurate records of strikes to be maintained. These records have mostly survived. There is a negligible risk from unexploded V-weapons on land today. Even if the 1000kg warhead failed to explode, the weapons are so large that they would have been observed and dealt with at the time. Therefore, V-weapons are referenced in this report not as a viable risk factor, but primarily in order to help account for evidence of damage and clearance reported.

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11. The Likelihood of Contamination from German Air Delivered UXBs

11.1. World War I

During WWI Britain was targeted and bombed by Zeppelin Airships, as well as Gotha and Giant fixed-wing aircraft. A WWI map of air raids and naval bombardments across England is presented in **Annex H**. Although several WWI bombs were recorded in the general area, this source does not record any WWI bombing incidents to have affected the site.

WWI bombs were generally smaller and dropped from a lower altitude than those used in WWII. This resulted in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress. For these reasons there is a limited risk that UXBs passed undiscovered in the urban environment. When combined with the relative infrequency of attacks and an overall low bombing density, the risk from WWI UXBs is considered low and will not be further addressed in this report.

11.2. World War II Bombing of the Urban District of Northfleet

The Luftwaffe's main objective for the attacks on Britain was to inhibit the country's economic and military capability. To achieve this they targeted airfields, depots, docks, warehouses, wharves, railway lines, factories, and power stations. As the war progressed the Luftwaffe bombing campaign expanded to include the indiscriminate bombing of civilian areas in an attempt to subvert public morale.

During WWII the site was located within the Urban District of Northfleet, which sustained an overall high density of bombing with an average of 103.2 items of ordnance falling per 1,000 acres according to official Home Office bombing statistics, as represented in the table below. This was mainly due to the industrial capacity of the town and its position on the River Thames, with numerous factories and commercial ports located along the harbour area. The town was thus a prominent target for Luftwaffe attacks, with prominent industrial entities such as the Bowater Paper Mill attracting bombing raids, which were just east of the site (Luftwaffe target photography presented in **Annex I**).

The town's position on the Thames Estuary, in close proximity to London, made it an ideal target for German bomber aircraft returning from a raid on the capital and to undertake 'tip and run' style attacks prior to returning across the channel.

Records of bombing incidents in the civilian areas of the Urban District of Northfleet were typically collected by Air Raid Precautions wardens and collated by Civil Defence personnel. Some other organisations, such as port and railway authorities, maintained separate records. Records would be in the form of typed or hand written incident notes, maps and statistics. Bombing data was carefully analysed, not only due to the requirement to identify those parts of the country most needing assistance, but also in an attempt to find patterns in the Germans' bombing strategy in order to predict where future raids might take place.

Records of bombing incidents are presented in the following sections.

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11.3. WWII Home Office Bombing Statistics

The following table summarises the quantity of German air delivered bombs (excluding 1kg incendiaries and anti-personnel bombs) dropped on the Urban District of Northfleet between 1940 and 1945.

Record of German Ordnance Dropped on the Urban District of Northfleet		
Area Acreage		**3,770**
Weapons	High Explosive bombs (all types)	364
	Parachute mines	3
	Oil bombs	7
	Phosphorus bombs	0
	Fire pots	9
	Pilotless aircraft (V-1)	5
	Long range rocket bombs (V-2)	1
Total		**389**
Number of Items per 1,000 acres		**103.2**

Source: Home Office Statistics
This table does not include UXO found during or after WWII.

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. Although the risk relating to IBs is lesser than that relating to larger HE bombs, they were similarly designed to inflict damage and injury. Anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. Although Home Office statistics did not record these types of ordnance, both should not be overlooked when assessing the general risk to personnel and equipment.

11.4. Kent Daily Bomb Maps

To understand the density of bombing in the region of the site areas, bomb maps covering the entirety of Kent were obtained from the Kent History and Library Centre for the purposes of this assessment. Whilst the mapping is a useful resource for understanding the general locations of incidents across individual districts on a daily basis, the mapping was recorded on small scale maps that depicted the whole county. Consequently, it is not possible to determine the exact locations of individual strikes, beyond establishing the approximate locality of the incident.

Furthermore, it is typical that single plotted strikes may represent numerous incidents of bombing. This is especially likely in cases of incendiary bombing, as incendiary bombs were frequently deployed in high numbers. As a result, this mapping has been used largely as an initial reference tool, which has subsequently been cross-referenced with other resources to fully appreciate the risk to the site area.

Examples of the Kent daily bomb maps are presented in **Annex J**. Unfortunately, due to the small-scale of the mapping it has not been possibly to precisely overlay the site areas onto the mapping. Map editions plotting incidents on or close to the approximate site area are discussed in the table below.

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Kent Daily Bomb Maps	
Date Range	**Comments**
28th August 1940	**Incendiary bombing** recorded in the vicinity of the site.
8th September 1940	**Incendiary bombing** recorded to the east of the site.
14th September 1940	**Two HE bomb incidents** recorded in the wider vicinity east of the site, on the Thames River
5th October 1940	**Incendiary bombing** recorded in the vicinity of the site.
23rd October 1940	**One HE bomb incident** recorded in the vicinity of the site.
14th September 1940	**One HE bomb incident** and **incendiary bombing** recorded in the wider vicinity west of the site.
17th March 1941	**One HE bomb incident** recorded in the vicinity of the site.
23rd March 1941	**One HE bomb incident** recorded in the vicinity of the site.

11.5. V-1 and Shells Daily Bomb Census Map

Bomb plot maps showing the location of all the V-1 and shell incidents in the County of Kent was compiled by the Kent Messenger in 1944. Due to the large scale of the maps, only the incidents wherein the radius of the incident overlapped with the site have been listed below. The sections covering the area of the site were checked and are presented in **Annex K**.

V-1 and Shells Daily Bomb Census Maps	
Date Range	**Comments**
19th July 1944	**One V-1 Bomb Strike** recorded to the south-west of the site.

11.6. Northfleet and Medway Group War Diary

War diaries covering the Urban District of Northfleet and the wider Medway group area were obtained from the Kent History and Library Centre. These diaries were likely compiled by local Air Raid Precaution (ARP) personnel and volunteers during the war and provide the location, time, type of bomb and damage caused by bombing incidents across numerous areas in the Urban District of Northfleet. This record set is not believed to be comprehensive and does not appear to cover certain periods of the war. .

A transcription of the associated written records for bombs which fell in the site area is presented in the table below. The relevant records are presented in **Annex L**.

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Northfleet and Medway Group War Diary			
Date	**Location**	**Type of Bomb (s)**	**Comments**
14th September 1940	Northfleet 083/932	4 HE Bombs and Incendiary Bomb	Minor bombing. 4 HE's in pulp yard of **Bowater Paper Mills** and Incendiary Bombs found in vicinity
12th December 1940	Northfleet 074/930	2 HE Bombs and 1 Oil Bomb	**Bowater Paper Mills.** I.Bs exploded in Boiler Room. 1 HE UXB in fitters shop. Production suspended
23rd October 1940	Northfleet 074/930	500kg HE Bomb	One large HE exploded in Cretehall Road
11th February 1944	Northfleet 063/931	2 HE bombs	Factory Road

11.7. Anecdotal Accounts of Bombing in Northfleet

Sourced from the BBC's 'WW2 People's War', an online archive of anecdotal accounts of air raids drawn from the experiences of British citizens alive during the War. In this extract, a Peter Rowdan details an air raid in Northfleet:

> *"In 1943 I left school at the age of 14 and he went to work at Bowater's making munitions they manufactured Bofor guns and Triple oerlican guns which were mounted in coal railway wagons. The factory was bombed twice during the war… Bowater's yard had a massive shower of what look like leaves falling from the sky but it was actually pieces of aluminium shrapnel from the V2 rocket."*[2]

This anecdote confirms that the Bowater factory complex, immediately west of the site, did indeed suffer multiple bomb strikes, including from a V-2 weapon.

11.8. WWII-Era Aerial Photography

WWII-era aerial photography for the site area was obtained from the National Monuments Record Office (Historic England). This photography provides a record of the potential composition of the site during the war, as well as its condition immediately following the war (**see Annex M**).

WWII-Era Aerial Photography	
Date	**Description**
18th April 1944	This aerial image taken during the later stages of the war covers most of the site boundary, albeit not a small section of the southern part of the site. As with pre-war photography, the site appears to be predominantly undeveloped ground. No obvious indications of bomb damage, such as craters, or areas of disturbed ground, are evident within this image. The residential housing situated in the south-eastern section of the site appears externally intact, with no indications of bomb damage such as clearance or missing roofs. It appears that the Paper Mills factories, just east of the site, have been damaged. Some of the roofing is white – white tiled roofing is often indicative of repair work resulting from bomb damage. A visual overlay highlighting the damage to the Paper Mill factories is presented in **Annex M2.**

[2] *https://www.bbc.co.uk/history/ww2peopleswar/stories/82/a4401082.shtml*

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11.9. Abandoned Bombs

A post air-raid survey of buildings, facilities, and installations would have included a search for evidence of bomb entry holes. If evidence of an entry hole was encountered, Bomb Disposal Officer Teams would normally have been requested to attempt to locate, render safe, and dispose of the bomb. Occasionally, evidence of UXBs was discovered but due to a relatively benign position, access problems, or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an 'abandoned bomb'.

Given the inaccuracy of WWII records, and the fact that these bombs were 'abandoned', their locations cannot be considered definitive or the lists exhaustive. The MoD states that 'action to make the devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that were never recorded.

1st Line Defence holds no records of officially registered abandoned bombs at or near the site of the proposed works.

11.10. Bomb Disposal Tasks

The information service from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (now part of 29 EOD & Search Group) no longer processes commercial requests for information. It has therefore not been possible to include any updated official information regarding bomb disposal/clearance tasks with regards to this site. A database of known disposal/clearance tasks has been referred to which does not make reference to such instances occurring within the site of proposed works. If any relevant information is received at a later date, GVR Geoservices Ltd will be advised.

11.11. Evaluation of German Air Delivered UXO Records

Factors	Conclusion
Density of Bombing *It is important to consider the bombing density when assessing the possibility that UXBs remain in an area. High bombing density could allow for error in record keeping due to extreme damage caused to the area.*	During WWII the site was located within the Urban District of Northfleet, which sustained an overall high density of bombing with an average of 103.2 items of ordnance falling per 1,000 acres according to official Home Office bombing statistics. This was mainly due to the industrial capacity of the town and its position on the River Thames, with numerous factories and commercial ports located along the harbour area. Kent Daily Bomb Mapping records numerous bomb incidents within the Northfleet area, although the mapping was recorded on small scale maps and thus it is not possible to determine the exact locations of individual bomb strikes, beyond establishing the approximate locality of the incidents. Northfleet and Medway Group War Diary written records record several bomb incidents within the vicinity of the site, most notably at the location of the Paper Mills directly north-east of the site.. No bomb incidents are recorded directly within the site boundary, although there are no major structures within the site boundary from which to identify the location of a bomb strike. Anecdotal evidence corroborates these written records, confirming Bowater Paper Mill did indeed suffer several bomb strikes.

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Damage *If buildings or structures on a site sustained bomb or fire damage, any resulting rubble and debris could have obscured the entry holes of unexploded bombs dropped during the same or later raids. Similarly, a high explosive bomb strike in an area of open agricultural land will have caused soil disturbance, increasing the risk that a UXB entry hole would be overlooked.*	WWII-era aerial photography of the site from 1944 shows no obvious indications of bomb damage such as craters, or ground disturbances in the undeveloped portions of the site. The housing, situated in the south-eastern section of the site, also appears externally intact and undamaged. There is evidence of bomb damage in the vicinity of the site, and roofing repairs can be observed on the Paper Mills factory to the north-east of the site- see **Annex M2**. This damage to the Paper Mills complex is also recorded in written records, matching with the observable damage on WWII-era aerial photography.
Ground Cover *The nature of the ground cover present during WWII would have a substantial influence on any visual indication that may indicate UXO being present.*	The ground cover is not considered to be homogenous across the site boundary. The south of the site is not considered to have had ground cover conducive to the detection of UXO as it was occupied by predominantly undeveloped ground. UXO entry holes, which could be as small as 20cm in diameter and could have easily been obscured by the vegetation present within the site and its surrounds. The ground cover in the north of the site is considered to have been more conducive to the detection of UXO. This is because the site comprised of more developed land, including landscaped allotments, small structures and roadways.
Access Frequency *UXO in locations where access was irregular would have a greater chance of passing unnoticed than at those that were regularly occupied. The importance of a site to the war effort is also an important consideration as such sites are likely to have been both frequently visited and subject to post- raid checks for evidence of UXO.*	The access frequency of access to the site is not considered to have been homogenous. The southern section of the site, comprising of predominantly undeveloped ground, is considered to have experienced a low degree of access, owing to the lack of structures. The northern section of the site is considered to have experienced a higher degree of access, due to the presence of on-site structures and roadways, and the proximity of the nearby Paper Mills factory. How often the allotment gardens in this area were accessed is wholly dependent upon how often each owner visited their allotment garden. The south-eastern section of the site was occupied by residential housing. It appears that the housing survived the war structurally intact. Therefore, it is thought likely that residents would have continued to live there and therefore conduct post-raid checks, for evidence of UXO. Generally, more frequent access increases the likelihood UXO could go noticed and reported.
Bomb Failure Rate	There is no evidence to suggest that the bomb failure rate in the locality of the site would have been dissimilar to the 10% normally used.
Abandoned Bombs	1st Line Defence holds no records of abandoned bombs at or within the site vicinity.
Bombing Decoy sites	1st Line Defence could find no evidence of bombing decoy sites within the site vicinity.
Bomb Disposal Tasks	1st Line Defence could find no evidence of bomb disposal tasks within the site boundary and immediate area.

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12. Introduction to Allied Ordnance

12.1. General

Many areas across the UK may be at risk from Allied UXO because of both wartime and peacetime military use. Typical military activities and uses that may have led to a legacy of military UXO at a site include former minefields, home guard positions, anti-aircraft emplacements, training and firing ranges, military camps, as well as weapons manufacture and storage areas.

Although land formerly used by the military was usually subject to clearance before returned to civilian use, items of UXO are sometimes discovered and can present a potential risk to construction projects.

12.2. Defending the UK From Aerial Attack

During WWII the War Office employed a number of defence tactics against the Luftwaffe from bombing major towns, cities, manufacturing areas, ports and airfields. These can be divided into passive and active defences (examples are provided in the table below).

Active Defences	Passive Defences
• Anti-aircraft gun emplacements to engage enemy aircraft. • Fighter aircraft to act as interceptors. • Rockets and missiles were used later during WWII.	• Blackouts and camouflaging to hinder the identification of Luftwaffe targets. • Decoy sites were located away from targets and used dummy buildings and lighting to replicate urban, military, or industrial areas. • Barrage balloons forced enemy aircraft to greater altitudes. • Searchlights were often used to track and divert adversary bomber crews during night raids.

Active defences such as anti-aircraft artillery present a greater risk of UXO contamination than passive defences. Unexploded ordnance resulting from dogfights and fighter interceptors is rarely encountered and difficult to accurately qualify.

12.2.1. Anti-Aircraft Artillery (AAA)

During WWII three main types of gun sites existed: heavy anti-aircraft (HAA), light anti-aircraft (LAA) and 'Z' batteries (ZAA). If the projectiles and rockets fired from these guns failed to explode or strike an aircraft they would descend back to land. The table below provides further information on the operation and ordnance associated with these type of weapons.

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Anti-Aircraft Artillery				
Item	**Description**			
HAA	These large calibre guns such as the 3.7" QF (Quick Firing) were used to engage high flying enemy bombers. They often fired large HE projectiles, which were usually initiated by integral fuzes, triggered by impact, area, time delay or a combination of aforementioned mechanisms.			
LAA	These mobile guns were intended to engage fast, low flying aircraft. They were typically rotated between locations on the perimeters of towns and strategically important industrial works. As they could be moved to new positions with relative ease when required, records of their locations are limited. The most numerous of these were the 40mm Bofors gun which could fire up to 120 x 40mm HE projectiles per minute to over 1,800m.			
Variations in HAA and LAA Ammunition	**Gun type**	**Calibre**	**Shell Weight**	**Shell Dimensions**
	3.0 Inch	76mm	7.3kg	76mm x 356mm
	3.7 Inch	94mm	12.7kg	94mm x 438mm
	4.5 Inch	114mm	24.7kg	114mm x 578mm
	40mm	40mm	0.9kg	40mm x 311mm
Z-AA	The three inch unrotated rocket/projectile known as the UP-3 had initially been developed for the Royal Navy. The UP-3 was also used in ground-based single and 128-round launchers known as ''Z'' batteries. The rocket, containing a high explosive warhead was often propelled by cordite.			

The conditions in which anti-aircraft projectiles may have fallen unnoticed within a site area are analogous to those regarding air delivered ordnance. Unexploded anti-aircraft projectiles could essentially have fallen indiscriminately anywhere within range of the guns. The chance of such items being observed, reported and removed during the war depends on factors such as land use, ground cover, damage and frequency of access – the same factors that govern whether evidence of a UXB is likely to have been noted. More information about these factors with regards to this particular site can be found in the German Air Delivered Ordnance section of this report.

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at **Appendix iv**.

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13. The Likelihood of Contamination from Allied Ordnance

13.1. Introduction

There are several factors that may serve to either affirm, increase, or decrease the level of risk within a site with a history of military usage. Such factors are typically dependent upon the proximity of the proposed area of works to training activities, munition productions and storage, as well as its function across the years.

This section will examine the history of the proposed site and assess to what degree, if any, the site could have become contaminated as a result of the military use of the surrounding area.

13.2. Military History of the Site of Proposed Works

Anecdotal evidence sourced online suggests that the Bowater Paper Mills, situated immediately east of the northern section of the site, may have been requisitioned during the war for the production of weaponry. It has not been possible to completely verify the information, but it is not considered likely that this would have involved the large-scale use and storage of explosives. Instead anecdotal accounts suggest that the factory was used to produce gun components. The factory was also outside the site boundary. Thus the factory is not considered to have any significant impact on the risk of Allied UXO contamination on-site.

It should also be highlighted that there is no evidence that the site itself formerly had any military occupation or usage that could have led to contamination with such items of Allied ordnance. Despite this, urban areas, such as the location of the site, can be at risk from buried unexploded anti-aircraft projectiles fired during WWII – as addressed below.

13.3. Evaluation of Contamination Risk from Allied UXO

1st Line Defence has considered the following potential sources of Allied ordnance contamination:

Sources of Allied UXO Contamination	Conclusion
Military Camps *Military camps present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training.*	1st Line Defence could find no evidence of a military camp within the site.
Anti-Aircraft Defences *Anti-Aircraft defences were employed across the country. Proximity to anti-aircraft defences increases the chance of encountering AA projectiles.*	1st Line Defence could find no evidence of Anti-Aircraft defences such as a HAA or LAA gun emplacement occupying or bordering the site. The closest HAA was located approximately 3.5km east of the site, however the range of a projectile can be up to 15km. The conditions in which HAA or LAA projectiles may have fallen unnoticed within a site footprint are analogous to those regarding German aerial delivered ordnance.
Home Guard Activity *The Home Guard regularly undertook training and ordnance practice in open areas, as well as burying ordnance as part of anti-invasion defences.*	Evidence of Home Guard activity is often difficult to locate, owing to the ad-hoc nature of Home Guard activity within each local area. Such training was often conducted on a small scale at the discretion of individual commanders and as such was seldom recorded officially. As such, no positive evidence could be found to confirm the presence of HG units within proximity to the site.

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Defensive Positions *Defensive positions suggest the presence of military activity, which is often indicative of ordnance storage, usage or disposal.*	There is no evidence of any pillbox, emplacement or other defensive features formerly located on or bordering the site footprint.
Training or firing ranges *Areas of ordnance training saw historical ordnance usage in large numbers, often with inadequate disposal of expended and live items. The presence of these ranges significantly impact on the risk of encountering items of ordnance in their vicinity.*	No evidence of training or firing ranges could be found within the site or surrounding area.
Defensive Minefields *Minefields were placed in strategic areas to defend the country in the event of a German invasion. Minefields were not always cleared with an appropriate level of vigilance.*	There is no evidence of defensive minefields affecting the site.
Ordnance Manufacture *Ordnance manufacture indicates an increased chance that items of ordnance were stored, or disposed of, within a location.*	No information of ordnance being stored, produced, or disposed of within the proposed site could be found.
Military Related Airfields *Military airfields present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training or bombing practice.*	The site was not situated within the perimeters or vicinity of a military airfield.

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14. The Likelihood of UXO Contamination Summary

The following table assesses the likelihood that the site was contaminated by items of German air delivered and Allied ordnance. Factors such as the risk of UXO initiation, remaining, and encountering will be discussed later in the report.

UXO Contamination Summary	
Quality of the Historical Record	The research has evaluated pre- and post-WWII Ordnance Survey maps, Luftwaffe reconnaissance imagery, post-war aerial imagery, Kent Daily Bomb Census Mapping, Medway Group War Diaries, WWII-era aerial imagery, in-house data and online sources The record set is of generally satisfactory quality. Although some incidents and evidence of damage are corroborated across the record-set, there are many discrepancies owing to the uncomprehensive nature of many sources.
German Aerial Delivered Ordnance	• During WWII the site was located within the Urban District of Northfleet, which sustained an overall high density of bombing with an average of 103.2 items of ordnance falling per 1,000 acres according to official Home Office bombing statistics. This was mainly due to the industrial capacity of the town and its position on the River Thames, with numerous factories and commercial ports located along the harbour area • Kent Daily Bomb Mapping records numerous bomb incidents within the Northfleet area, although the mapping was recorded on small scale maps and thus it is not possible to determine the exact locations of individual bomb strikes, beyond establishing the approximate locality of the incidents. • Northfleet and Medway Group War Diary written records record several bomb incidents within the vicinity of the site, most notably at the location of the Paper Mills directly north-east of the site.. No bomb incidents are recorded directly within the site boundary, although there are no major structures within the site boundary from which to identify the location of a bomb strike. • Anecdotal evidence corroborates these written records, confirming Bowater Paper Mill did indeed suffer several bomb strikes. • WWII-era aerial photography of the site from 1944 shows no obvious indications of bomb damage such as craters, or ground disturbances in the undeveloped portions of the site. The housing, situated in the south-eastern section of the site, also appears externally intact and undamaged. There is evidence of bomb damage in the vicinity of the site, and roofing repairs can be observed on the Paper Mills factory to the north-east of the site- see **Annex M2**. • The south of the site is not considered to have had ground cover conducive to the detection of UXO as it was occupied by predominantly undeveloped ground. UXO entry holes, which could be as small as 20cm in diameter and could have easily been obscured by the vegetation present within the site and its surrounds. The ground cover in the north of the site is considered to have been more conducive to the detection of UXO. This is because the site comprised of more developed land, including landscaped allotments, small structures and roadways • The access frequency of access to the site is not considered to have been homogenous. The southern section of the site, comprising of predominantly undeveloped ground, is considered to have experienced a low degree of access, owing to the lack of structures. The northern section of the site is considered to have experienced a higher degree of access, due to the presence of on-site structures and roadways, and the proximity of the nearby Paper Mills factory. How often the allotment gardens in this area were accessed is wholly dependent upon how often each owner visited their allotment garden. The south-eastern section of the site was occupied by residential housing. It appears that the housing survived the war structurally intact. Therefore, it is thought likely that residents would have continued to live there and therefore conduct post-raid checks, for evidence of UXO. Generally, more frequent access increases the likelihood UXO could go noticed and reported.

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	• To summarise, no positive evidence of on-site bomb strikes or bomb damage could be found. However, there is evidence of bomb strikes and bomb damage to roads and structures within the wider vicinity of the site, particularly in relation to the nearby former Bowater Paper Mill factory. Subsequently, although the evidence available does not indicate the UXO risk on site to be significantly elevated above the 'background level' of risk for Gravesend, the risk from UXO cannot be entirely discounted and has been designed as **Low-Medium**. As a result of this risk level, it is recommended that a UXO risk management plan is in place prior to intrusive works taking place and that any staff undertaking such works receive UXO awareness briefings.
Allied Ordnance	• Anecdotal evidence sourced online suggests that the Bowater Paper Mills, situated immediately east of the northern section of the site, may have been requisitioned during the war for the production of weaponry. It has not been possible to completely verify the information, but is it considered likely that this would have involved the large-scale use and storage of explosives, as the available evidence indicates that the factory was used to build the components of weapons. The factory was also outside the site boundary. This factor is thus not considered to have any significant impact on the risk of Allied UXO contamination on-site. • There is no evidence that the site formerly had any military occupation or usage that could have led to contamination with items of Allied ordnance, such as LSA and SAA. The conditions in which HAA or LAA projectiles may have fallen unnoticed within the site boundary are however analogous to those regarding aerial delivered ordnance.

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15. The Likelihood that UXO Remains

15.1. Introduction

It is important to consider the extent to which any explosive ordnance clearance (EOC) activities or extensive ground works have occurred on site. This may indicate previous ordnance contamination or reduce the risk that ordnance remains undiscovered.

15.2. UXO Clearance

1st Line Defence has found no evidence in the public domain or within internal records that any official ordnance clearance operations have taken place on site. Note however that we have not received confirmation of this fact from the 33 EOD Regiment Archive (now part of 29 EOD & Search Group). It should also be noted that in addition to 29 EOD & Search Group archival information, 1st Line Defence also do not currently have access to data that may be relevant including 5131(BD)SQN Archive, SD Training Technical Advisory Section (TAS) and MACA Records (bomb disposal callouts).

If such information is available at a later date, it is recommended that it be reviewed as it will assist with understanding both levels and types of contamination likely to be present, and may indicate risk reduction in certain areas.

15.3. Post-War Redevelopment

The site has been significantly redeveloped post-war. Historical OS mapping and current satellite imagery indicates that a large area of industrial structures and associated hard-ground has been developed on the previously mostly undeveloped land within the site boundary, which has subsequently been redeveloped. 1st Line Defence has found no evidence to suggest that any items of UXO were encountered during these prior post-war works on site.

The risk of UXO remaining is considered to be mitigated at the location of and down to the depth of any post-war redevelopment on site. For example, the risk from deep buried UXO will only have been mitigated within the volumes of any post-war pile foundations or deep excavations for basement levels. The risk will however remain within virgin geology below and amongst these post-war works, down to the maximum bomb penetration depth.

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16. The Likelihood of UXO Encounter

16.1. Introduction

For UXO to pose a risk at a site, there should be a means by which any potential UXO might be encountered on that site.

The likelihood of encountering UXO on the site of proposed works would depend on various factors, such as the type of UXO that might be present and the intrusive works planned on site. In most cases, UXO is more likely to be present below surface (buried) than on surface.

In general, the greater the extent and depth of intrusive works, the greater the risk of encountering. The most likely scenarios under which items of UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

Generally speaking, the risk of encountering any type of UXO will be minimal for any works planned within the footprint and down to the depth of post-war foundations and excavations.

16.2. Encountering Air Delivered Ordnance

Since an air delivered bomb may come to rest at any depth between just below ground level and its maximum penetration depth, there is a chance that such an item (if present) could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level as well as at depth.

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17. The Likelihood of UXO Initiation

17.1. Introduction

UXO does not spontaneously explode. Older UXO devices will require an external event/energy to create the conditions for detonation to occur. The likelihood that a device will function can depend on a number of factors including the type of weaponry, its age and the amount of energy it is struck with.

17.2. Initiating Air Delivered Ordnance

Unexploded bombs do not spontaneously explode. All high explosive filling requires significant energy to create the conditions for detonation to occur.

In recent decades, there have been a number of incidents in Europe where Allied UXBs have detonated, and incidents where fatalities have resulted. There have been several hypotheses as to the reason why the issue is more prevalent in mainland Europe – reasons could include the significantly greater number of bombs dropped by the Allied forces on occupied Europe, the preferred use by the Allies of mechanical rather than electrical fuzes, and perhaps just good fortune. The risk from UXO in the UK is also being treated very seriously in many sectors of the construction industry, and proactive risk mitigation efforts will also have affected the lack of detonations in the UK.

There are certain construction activities which make initiation more likely, and several potential initiation mechanisms must be considered:

UXB Initiation	
Direct Impact	Unless the fuze or fuze pocket is struck, there needs to be a significant impact e.g. from piling or large and violent mechanical excavation, onto the main body of the weapon to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
Re- starting the Clock	A small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion would have taken place within the fuze mechanism over the last 70+ years that would prevent clockwork mechanisms from functioning. Nevertheless, it was reported that the clockwork fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-start.
Friction Impact	The most likely scenario resulting in the detonation of a UXB is friction impact initiating the shock-sensitive fuze explosive. The combined effects of seasonal changes in temperature and general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive which could detonate the main charge.

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18. Consequences of Initiation/Encounter

18.1. Introduction

The repercussions of the inadvertent detonation of UXO during intrusive ground works, or if an item or ordnance is interfered with or disturbed, are potentially profound, both in terms of human and financial cost. A serious risk to life and limb, damage to plant and total site shutdown during follow-up investigations are potential outcomes. However, if appropriate risk mitigation measures are put in place, the chances of initiating an item of UXO during ground works is comparatively low.

The consequences of encountering UXO can be particularly notable in the case of high-profile sites (such as airports and train stations) where it is necessary to evacuate the public from the surrounding area. A site may be closed for anything from a few hours to a week with potentially significant cost in lost time. It should be noted that even the discovery of suspected or possible item of UXO during intrusive works (if handled solely through the authorities), may also involve significant loss of production.

18.2. Consequences of Detonation

When considering the potential consequences of a detonation, it is necessary to identify the significant receptors that may be affected. The receptors that may potentially be at risk from a UXO detonation on a construction site will vary depending on the site specific conditions but can be summarised as follows:

- People – site workers, local residents and general public.
- Plant and equipment – construction plant on site.
- Services – subsurface gas, electricity, telecommunications.
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and the weakening of support structures.
- Environment – introduction of potentially contaminating materials.

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19. 1st Line Defence Risk Assessment

19.1. Risk Assessment Stages

Taking into account the quality of the historical evidence, the assessment of the overall risk from unexploded ordnance is based on the following five considerations:

1. That the site was contaminated with unexploded ordnance.
2. That unexploded ordnance remains on site.
3. That such items will be encountered during the proposed works.
4. That ordnance may be initiated by the works operations.
5. The consequences of encountering or initiating ordnance.

19.2. Assessed Risk Level

1st Line Defence has assessed that there is an overall **Low-Medium Risk** from German and anti-aircraft unexploded ordnance at the site of proposed works. There is also an assessed **Low Risk** from Allied ordnance.

Ordnance Type	Risk Level			
	Negligible	Low	Medium	High
German Unexploded HE Bombs		✓		
German 1kg Incendiary Bombs		✓		
Allied Anti-Aircraft Artillery Projectiles		✓		
Allied Land Service and Small Arms Ammunition		✓		

Please note – although the risk from unexploded ordnance on this site has been assessed as 'Low', this does not mean there is 'no' risk of encountering UXO. This report has been undertaken with due diligence, and all reasonable care has been taken to access and analyse relevant historical information. By necessity, when dealing historical evidence, and when making assessments of UXO risk, various assumptions have to be made which we have discussed and justified throughout this report. Our reports take a common-sense and practical approach to the assessment of risk, and we strive to be reasonable and pragmatic in our conclusions.

It should however be stressed that if any suspect items are encountered during the proposed works, 1st Line Defence should be contacted for advice/assistance, and to re-assess the risk where necessary. The mitigation measures outlined in the next section are recommended as a minimum precaution to alert ground personnel to the history of the site, what to look out for, and what measures to take in the event that a suspect item is encountered. It should also be noted that the conclusions of this report are based on the scope of works outlined in the 'Proposed Works' section of this report. Should the scope of works change or additional works be proposed, 1st Line Defence should be contacted to re-evaluate the risk.

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20. Proposed Risk Mitigation Methodology

20.1. General

The following risk mitigation measures are recommended to support the proposed works at Northfleet, Gravesend, Kent:

Type of Work	Recommended Mitigation Measure
All Works	• **UXO Risk Management Plan** It is recommended that a site-specific plan for the management of UXO risk be written for this site. This plan should be kept on site and be referred to in the event that a suspect item of UXO is encountered at any stage of the project. It should detail the steps to be taken in the event of such a discovery, considering elements such as communication, raising the alarm, nominated responsible persons etc. Contact 1st Line Defence for help/more information. • **Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.** As a minimum precaution, all personnel working on the site should be briefed on the basic identification of UXO and what to do in the event of encountering a suspect item. This should in the first instance be undertaken by a UXO Specialist. Posters and information on the risk of UXO can be held in the site office for reference.

In making this assessment and recommending these risk mitigation measures, if known, the works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

1st Line Defence Limited **19/05/23**

This Report has been produced in compliance with the Construction Industry Research and Information Association (CIRIA) C681 guidelines for the writing of Detailed UXO Risk Assessments.

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This report has been prepared by 1st Line Defence Limited with all reasonable care and skill. The report contains historical data and information from third party sources. 1st Line Defence Limited has sought to verify the accuracy and comprehensiveness of this information where possible but cannot be held accountable for any inherent errors. Furthermore, whilst every reasonable effort has been made to locate and access all relevant historical information, 1st Line Defence cannot be held responsible for any changes to risk level or mitigation recommendations resulting from documentation or other information which may come to light at a later date.

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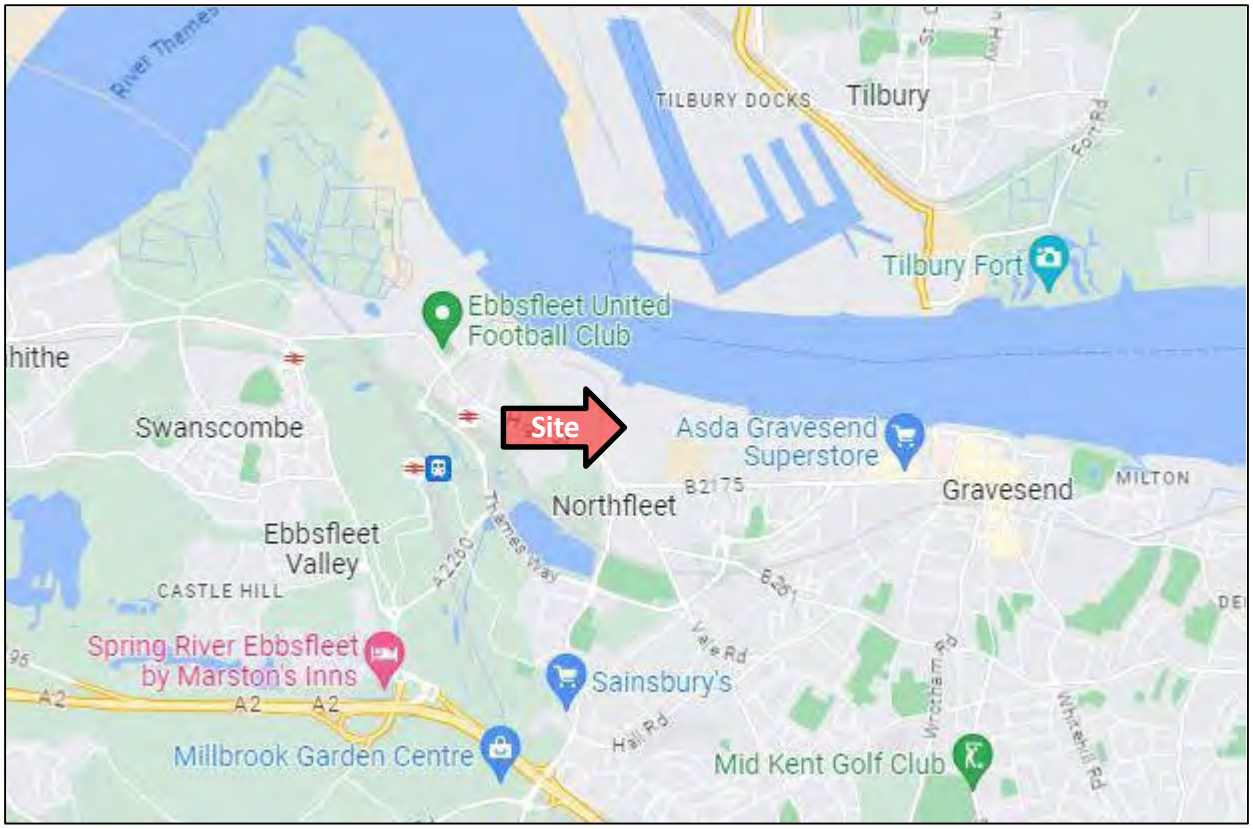
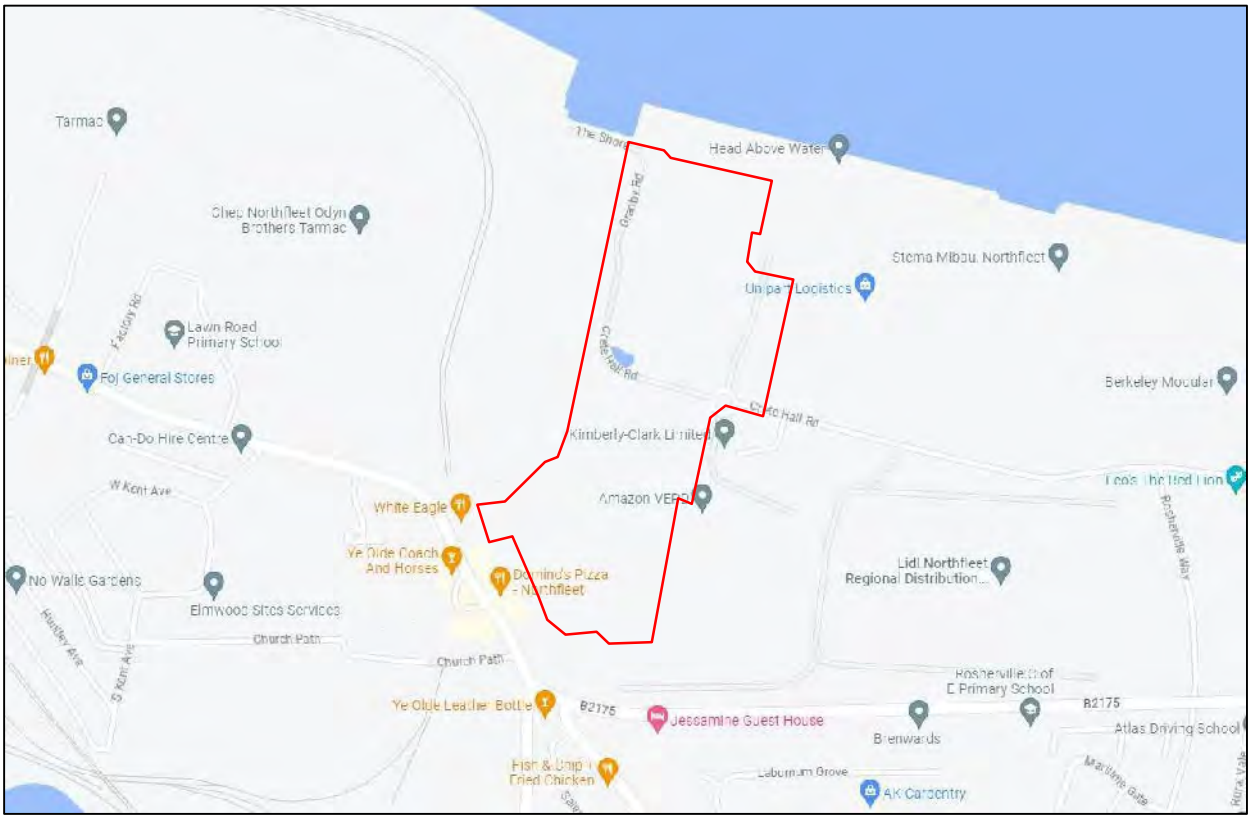
Site Location Maps

Annex: **A**





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Client:	**GVR Geoservices Ltd**	**Approximate site boundary**	N
Project:	**Northfleet, Gravesend, Kent**		
Ref:	**DA11104a-00**	Source: Google Maps	

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Recent Aerial Photography

Annex: **B**

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Source: Google Earth ™ Mapping Services

Approximate site boundary

N

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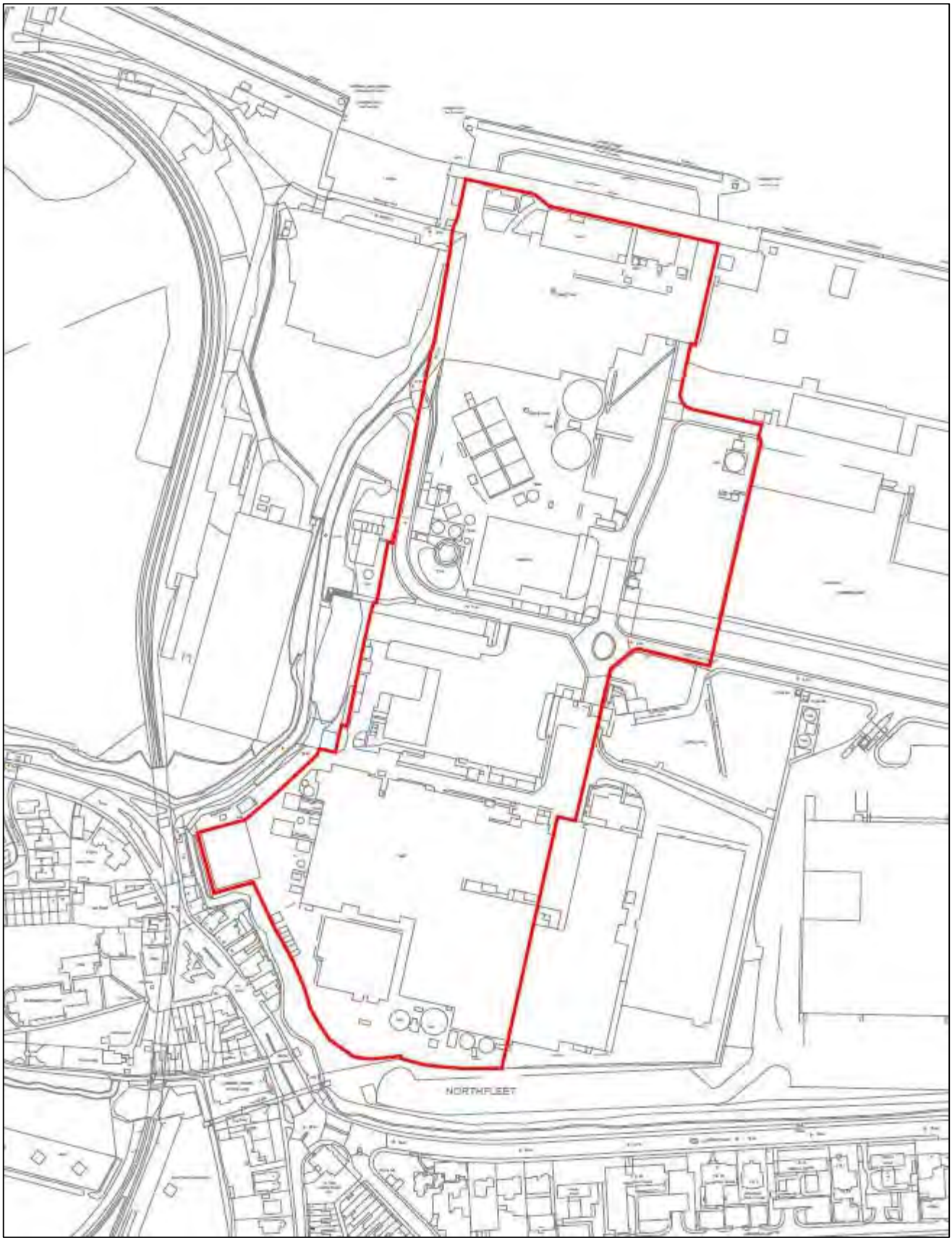
Client Provided Site Plan

Annex: **C**



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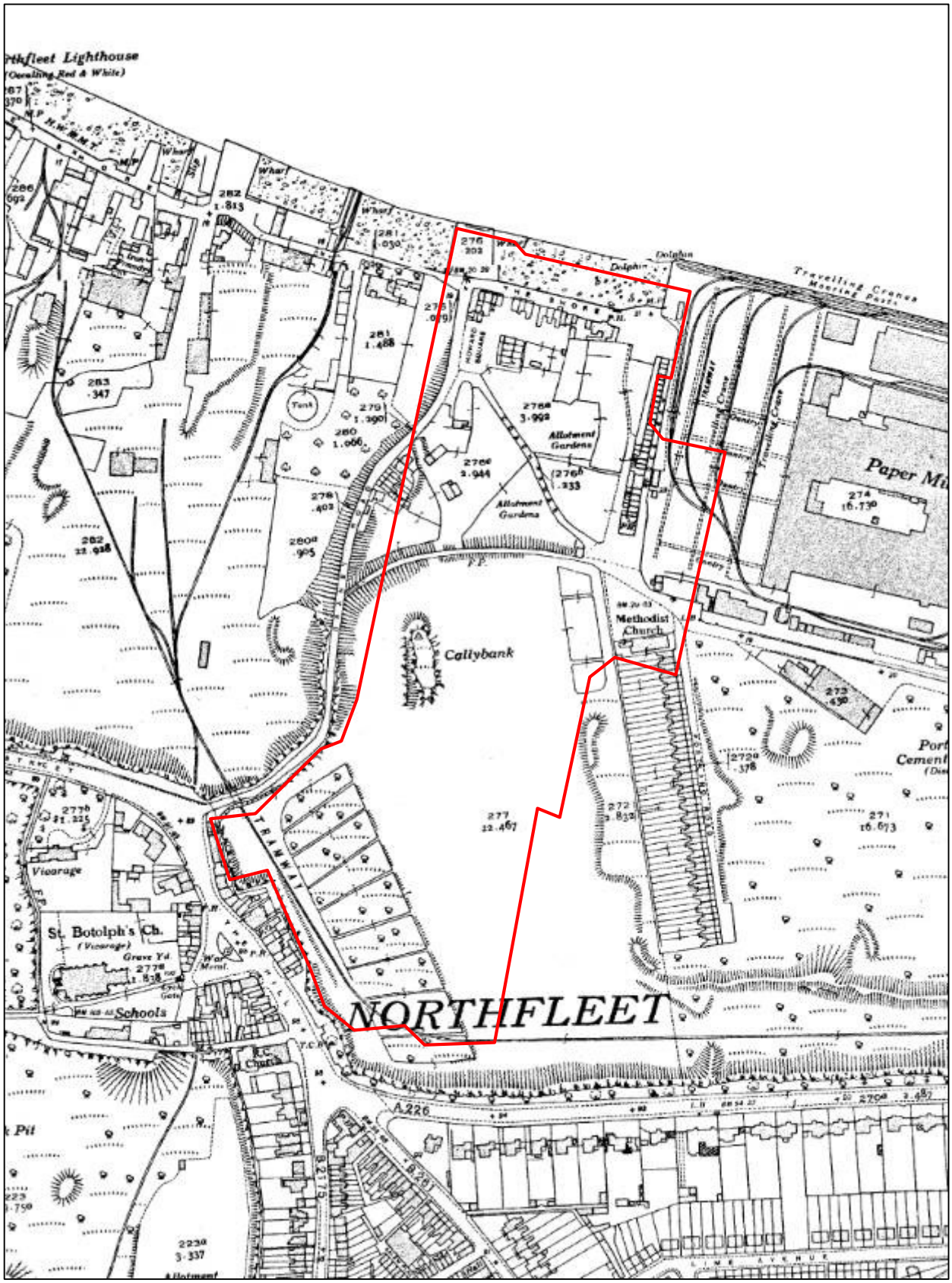
Pre-WWII Historical Map, 1939

Annex: **D1**



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Post-WWII Historical Map, 1946

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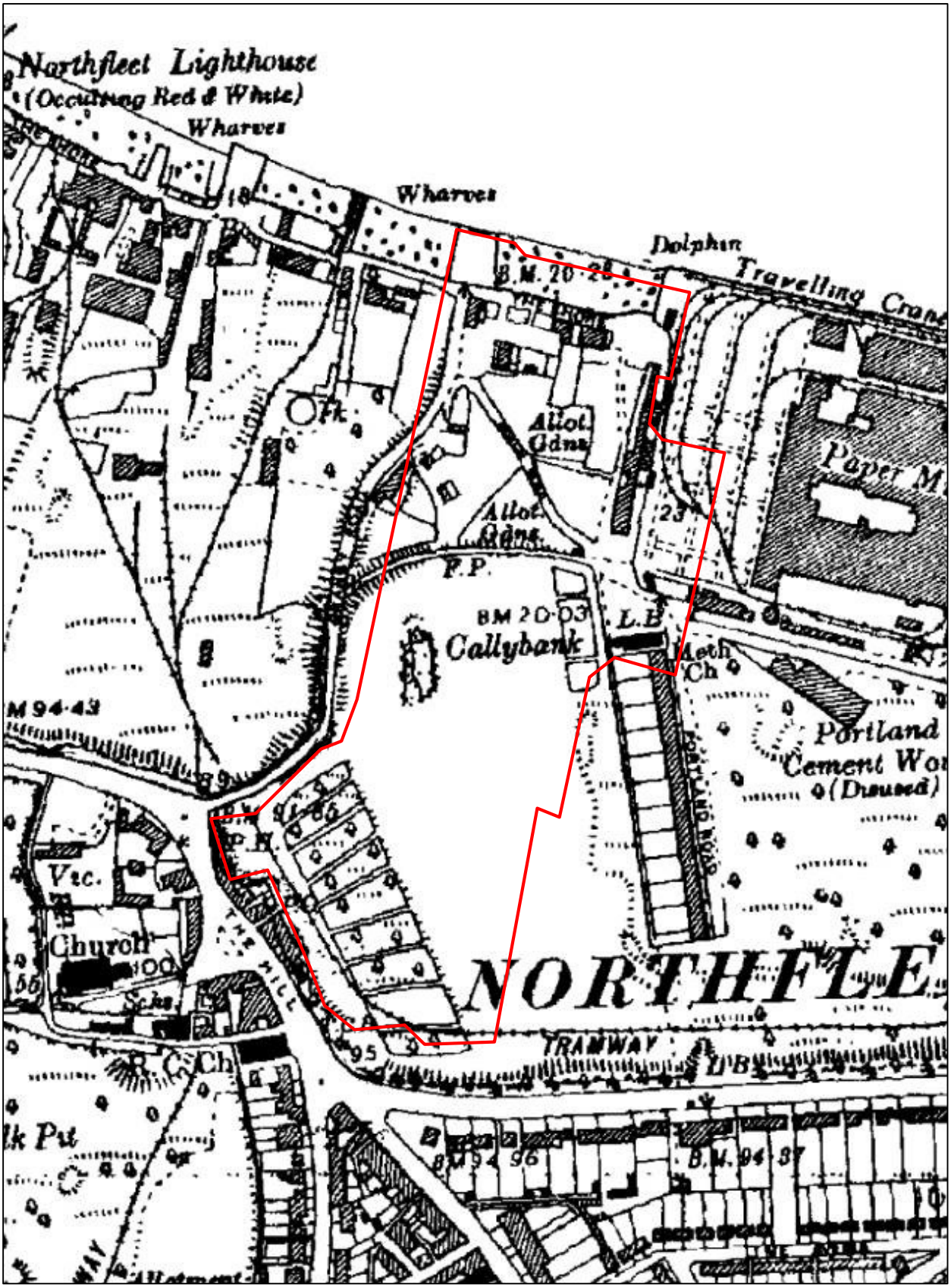

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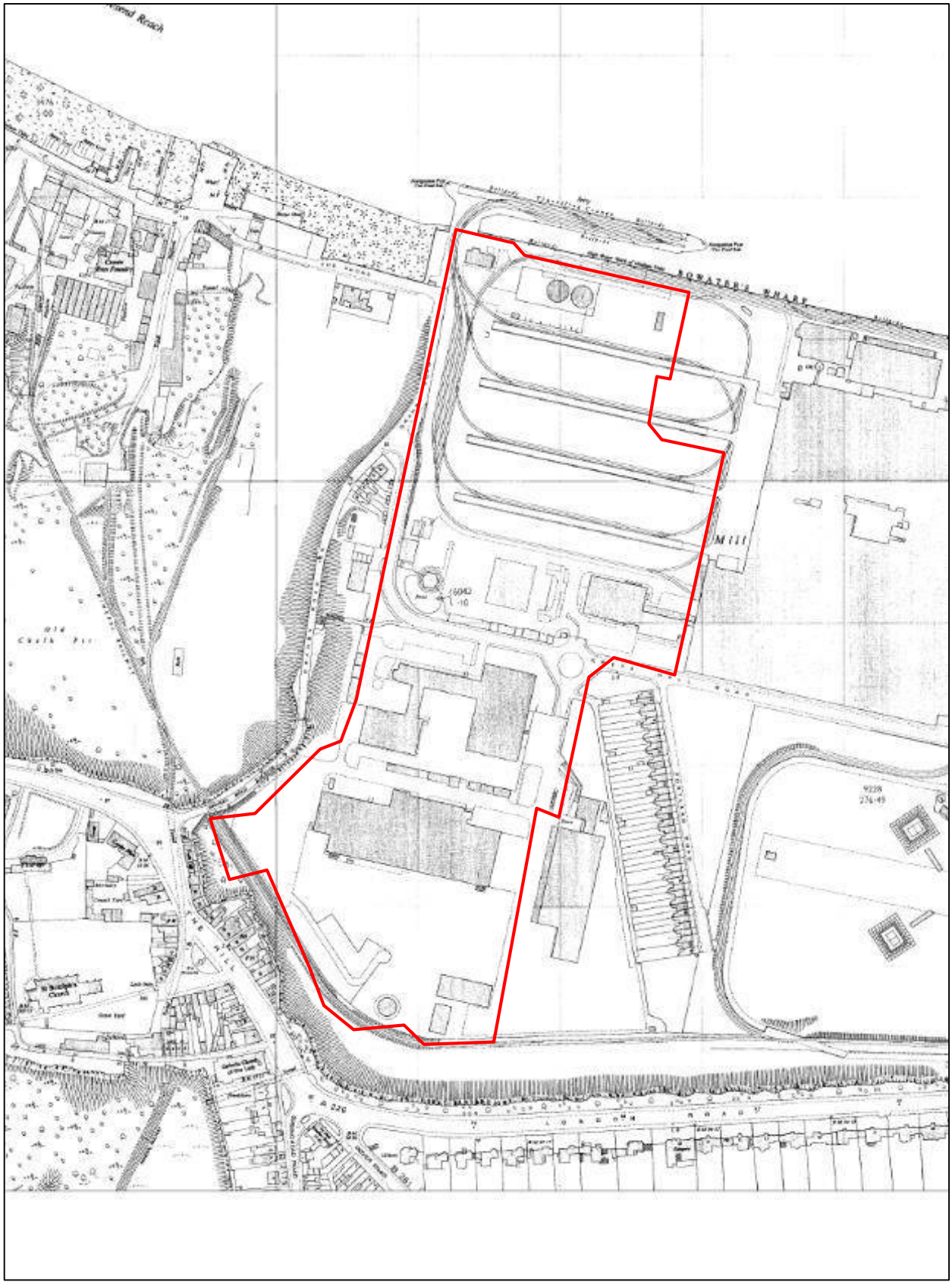
Post-WWII Historical Map, 1967

Annex: D3



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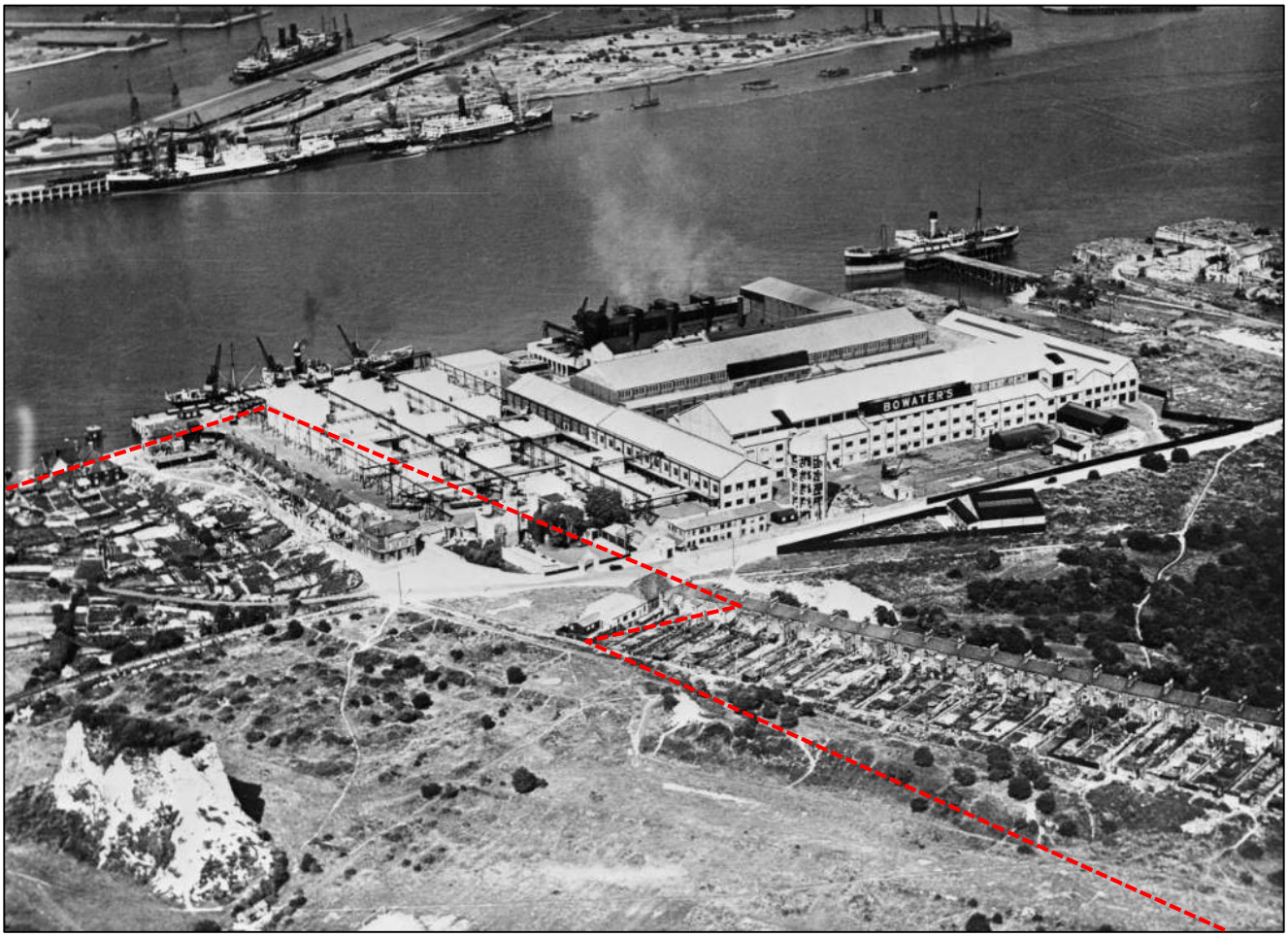
Approximate Partial Site Area.



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Approximate site boundary

Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00**

Source: Britain From Above

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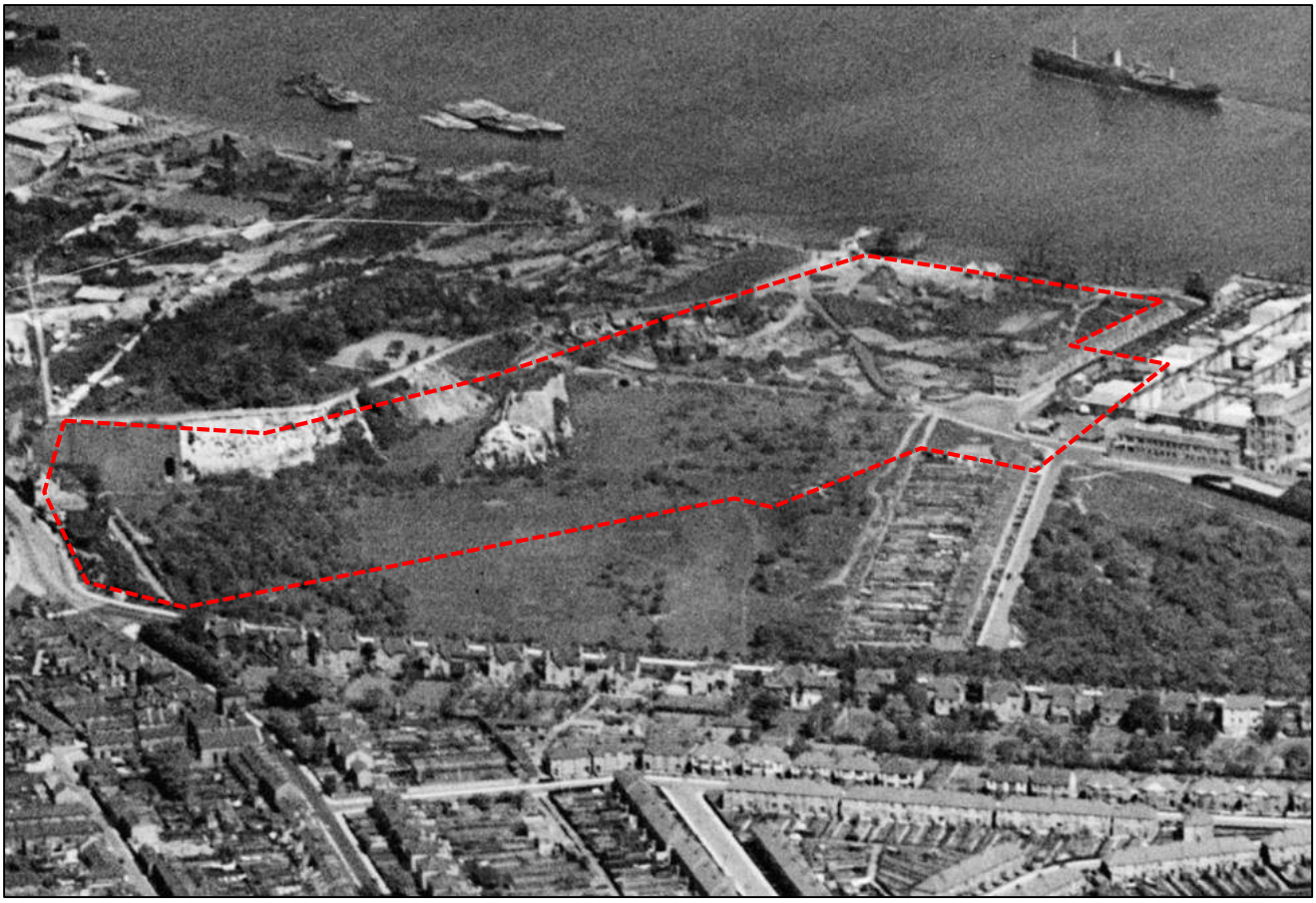
Approximate Site Area.



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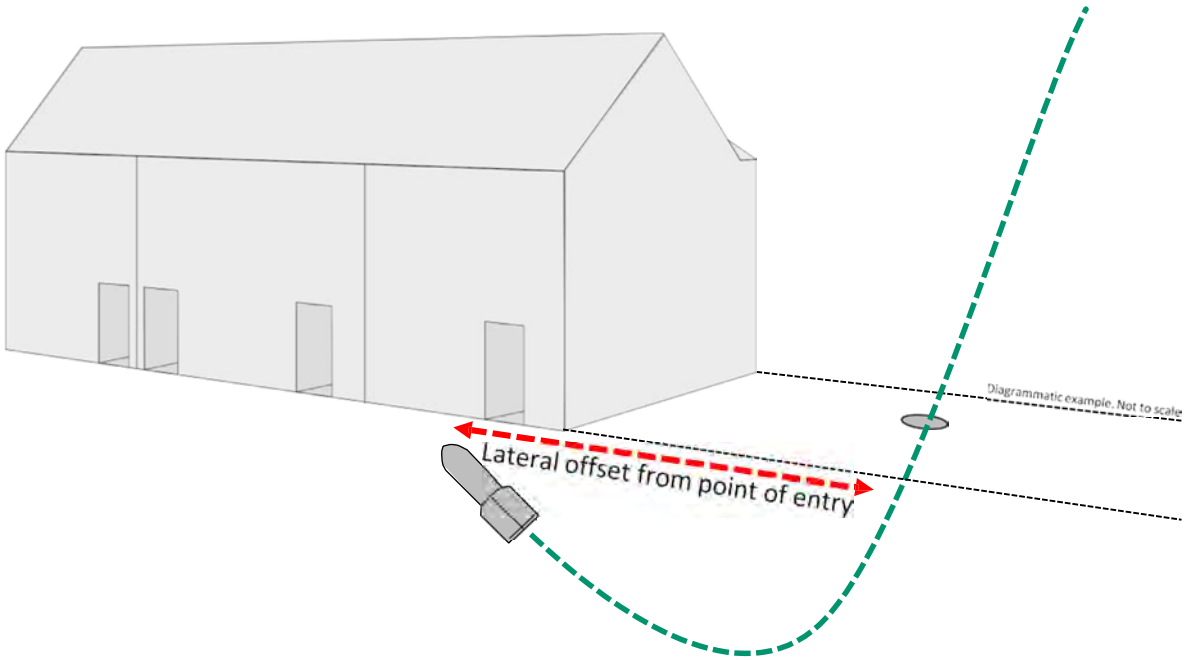
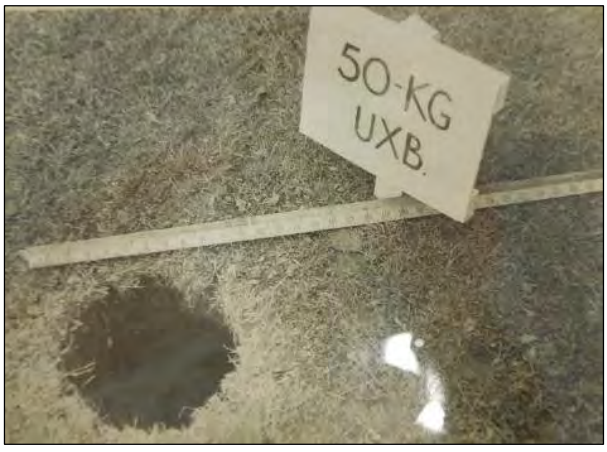
Example of UXO Entry Hole / The 'J-curve' Effect Principle





Top: J-curve Effect - Due to angle of entry, unexploded bombs would often end their trajectory at a lateral offset from point of entry, often ending up beneath adjacent extant structures/sites. The photograph above shows a 250kg unexploded bomb found in Bermondsey in 2015, pointing upwards, demonstrating 'J-curve'.

One of the most common scenarios for UXO going unnoticed was when a UXB fell into a 'bomb site' (such as the area shown **Top Left**), the entry hole of the bomb obscured by any debris and rubble present. Note that the entry hole of a 50kg UXB could be as little as 20cm in diameter (**Left**).

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Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00** Source: Various sources

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BBC NEWS

Bermondsey bomb: World War Two device safely removed

An unexploded World War Two bomb found in south London has been driven away safely under police and Army escort.

The 500lb (250kg) device was found on a building site in Grange Walk, Bermondsey on Monday.

Two primary schools were closed and hundreds of homes were evacuated as a precaution.

A cordon and 656ft (200m) exclusion zone was lifted at about 18:15 GMT as the bomb was removed to a quarry in Kent to be detonated, police said.

The Metropolitan Police force said the device was a 'SA' 250kg WWII German air-dropped bomb, known to the Army's Royal Logistic Corps bomb disposal experts.

250kg German HE Bomb, March 2015

BBC NEWS

WW2 bomb found near London City Airport blown up

An unexploded World War Two bomb found near London City Airport has been detonated.

The 500kg device was discovered at the King George V Dock on Sunday during planned work at the airport.

It was closed and all flights were cancelled on Monday after an exclusion zone was put in place.

The detonation, which took take place off Shoeburyness, Essex, was postponed on Tuesday because of high winds and dangerous conditions for divers.

The 1.5m-long German bomb - which was found in a bed of silt, 15m underwater - was carefully removed from the Thames and placed in a secure location a mile away from the coast of Essex.

500kg German HE Bomb, February 2018

BBC NEWS

Exeter WW2 bomb is detonated after homes evacuated

More than 2,600 households and 12 university halls of residence were cleared before the 2,200lb (1,000kg) device **was destroyed** on Saturday.

Police said the blast left a crater about the size of a double-decker bus.

Police have reported large pieces of metal debris hitting buildings and said some properties in the 100m (330ft) exclusion zone had sustained "structural damage".

1000kg German HE bomb, February 2021

BBC NEWS

Great Yarmouth: Huge blast after unplanned WW2 bomb detonation

A World War Two bomb found in Great Yarmouth has detonated while work was being done to defuse it, causing a huge blast that was heard for miles.

Army specialists were attempting to disarm it when there was an unplanned detonation at about 17:00 GMT.

People on social media said they heard a loud bang and felt buildings shake 15 miles (24km) away.

There have been no reports of injuries among the Army, emergency services or the public, Norfolk Police said.

Cordons were put in place when the bomb was first discovered close to two gas pipes on Tuesday, and work began to make it safe.

250kg German HE Bomb, February 2023

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Client: **GVR Geoservices Ltd**

Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00** Source: BBC News

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Examples of Unexpected Detonation of WWII Bombs in Europe

BASF has confirmed that an explosive device, most likely a World War II-era bomb, caused the blast that left one person injured Tuesday at a plant construction site in Germany.

The explosion was reported at BASF's Ludwigshafen toluene diisocyanate (TDI) plant, which recently broke ground for a 300,000 metric tons per year TDI production plant and other construction to expand its facilities.

BASF Provides Some Details

Responding to a request from *PaintSquare News* for more information on Wednesday (Feb. 27), BASF's manager of media relations and corporate communications Europe, Ursula von Stetten, wrote in an email, "So here [are] the facts: The detonation took place at 10:00 a.m. One person was injured; the injury is not serious. He will be kept in the hospital for some days.

"Cause of the detonation was an explosive device, presumably a bomb deriving from the Second World War. The device detonated when grounding work was done. No details on [a] delay [are] available. At the moment, the exact circumstances of the incident are [being] evaluated."

1st March 2013

WWII bomb injures 17 at Hattingen construction site

Seventeen people were injured on Friday when a construction crew unwittingly detonated a buried World War II-era bomb in Hattingen.

An excavator apparently drove over a 250-kilogramme (550 pound) American bomb, damaging surrounding buildings. Most of the injured suffered auditory trauma from the blast, and the excavator operator suffered injuries to his hands, police in the German state of North Rhine-Westphalia said

"The hole was astoundingly small for such a large bomb full of so many explosives," Armin Gebhard, head of the Arnsberg department for military ordnance removal, told The Local. "But of course it damaged all the surrounding buildings too. We are really happy it wasn't worse."

19th September 2013

SPIEGEL ONLINE

Blast Kills One

World War II Bomb Explodes on German Motorway

A highway construction worker in Germany accidentally struck an unexploded World War II bomb, causing an explosion which killed him and wrecked several passing cars.

A World War II bomb has exploded during construction work on a German highway, killing one worker and injuring several motorists who were driving past, police said.

The worker had been cutting through the road surface near the south-western town of Aschaffenburg when his machine struck the bomb and triggered it. Police said they weren't sure yet what type of bomb it was. "The explosion seems to have been too small for it to have been an aircraft bomb," a police spokesman said.

23rd October 2006

BBC NEWS

World War II bomb kills three in Germany

A special commission is investigating the causes of the explosion, while prosecutors are considering whether the team leader should face charges of manslaughter through culpable negligence, the BBC's Oana Lungescu reports from Berlin.

The blast happened an hour before the defusing operation was due to start.

Officials said the three men who died were experienced sappers, or combat engineers, who over 20 years had defused up to 700 bombs.

More than 7,000 people were immediately evacuated when the 500kg bomb was found. Several schools, a kindergarten and local companies remain closed.

2nd June 2010

June 2006

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Source: Various news sources

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Unexploded Second World War bomb discovered under Somerset footpath

Unexploded WW2 bomb found at Kenfig Pool, Bridgend

Mortar thought to be from WWII found on Oshawa's Camp-X grounds

Unexploded bomb found in farmer's field

Royal Navy bomb disposal experts remove a World War Two shell discovered in a nature reserve

Holiday beach cordoned off after landslip sends more than a THOUSAND Second World War bombs and rockets tumbling onto the sands

Army bomb disposal team called to Blacksole Bridge in Herne Bay

Unexploded bomb found in Axminster

Storms and floods unearth unexploded wartime bombs

Land Service Ammunition (LSA) resulting from historic military activity is commonly encountered across the UK by the public and construction industry alike. Such finds are much more common in rural areas than in urban environments, and can often be anticipated in areas such as former RAF stations or ranges. However, such items are also encountered entirely by surprise where the landowner or developer has no knowledge of any previous military use of the land.

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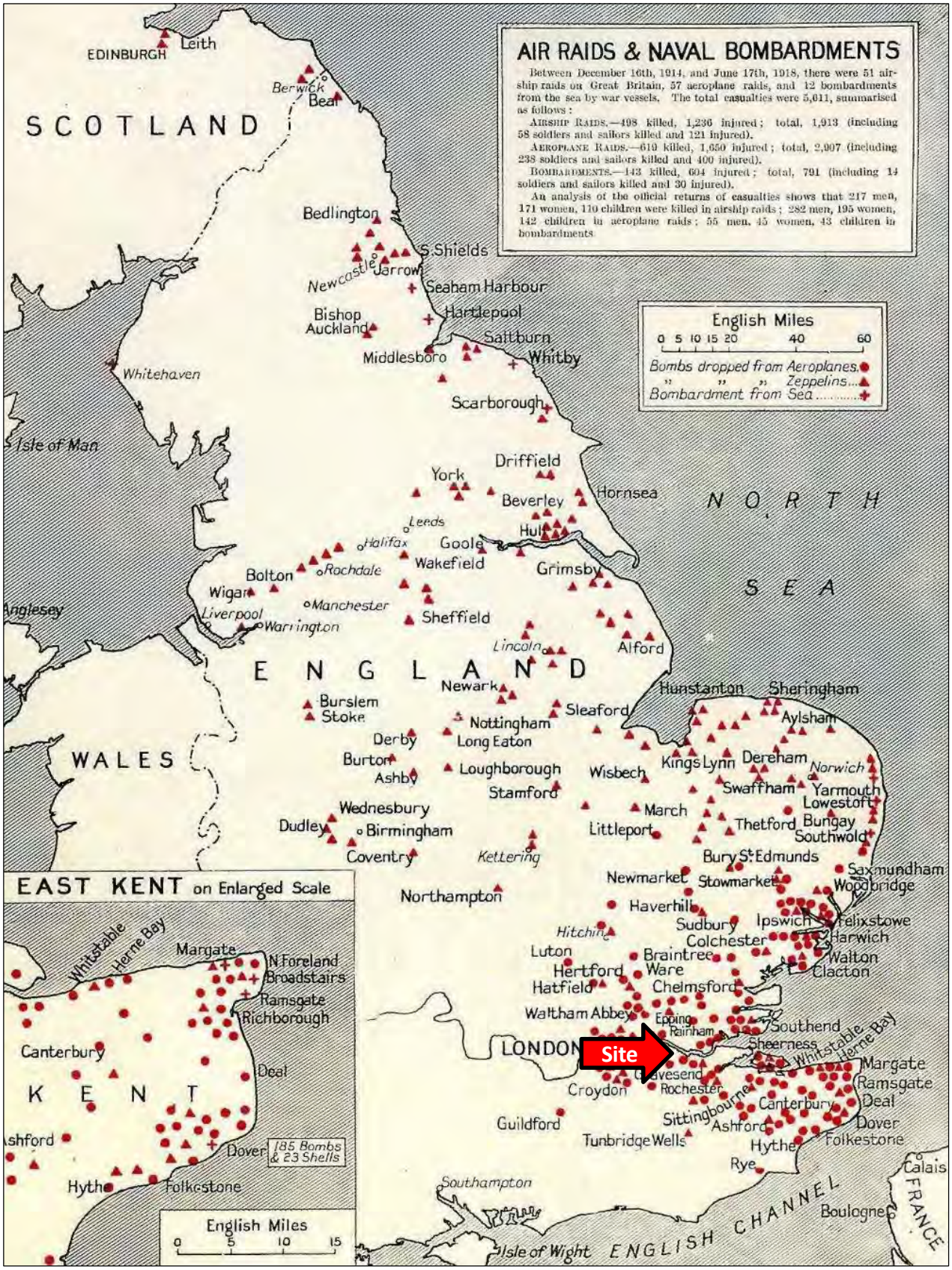
WWI Map of Air Raids and Naval Bombardments

Annex: H



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Ref: **DA11104a-00**

Source: J. Morris, *German Air Raids on Britain*

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Luftwaffe Photograph, 4th June 1939

Kent – Gravesend
A) 'Kraftwerk' (Power station)– Designated Luftwaffe target

The site located immediately west of target A

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Ref: **DA11104a-00**

Source: Nigel J. Clarke, "Adolf Hitler's Home Counties Holiday Snaps"

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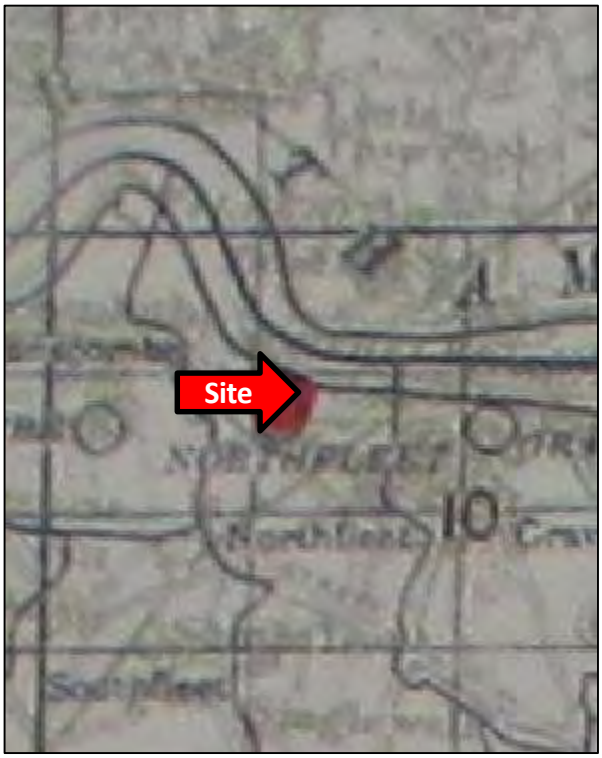
Kent Daily Bomb Mapping

Annex: **J1**

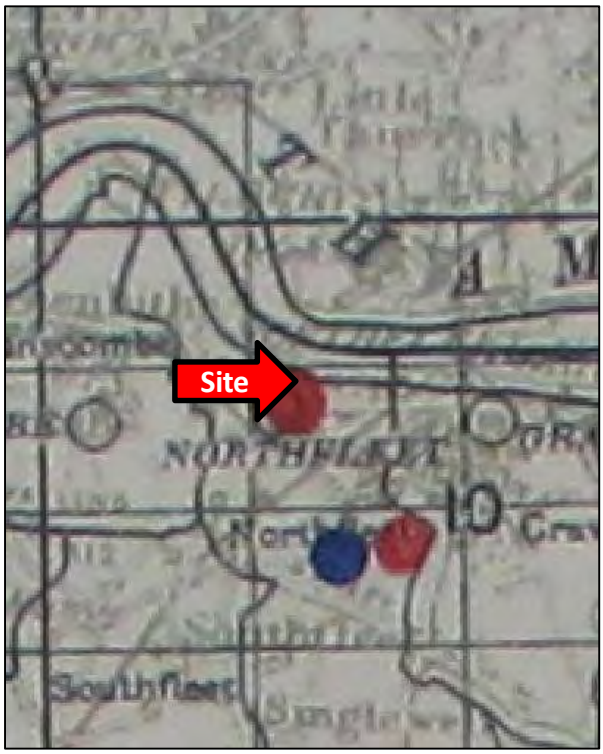
28th August 1940



8th September 1940

14th September 1940

5th October 1940



Recorded bomb strike Incendiary bomb strike

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Client: **GVR Geoservices Ltd**

Project: **Northfleet, Gravesend, Kent**

N

Ref: **DA11104a-00**

Source: Kent History and Library Centre

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Kent Daily Bomb Mapping

Annex: **J2**

23rd October 1940

14 September 1940

17th March 1941

March 23rd 1941

Recorded bomb strike Incendiary bomb strike

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Ref: **DA11104a-00**

Source: Kent History and Library Centre

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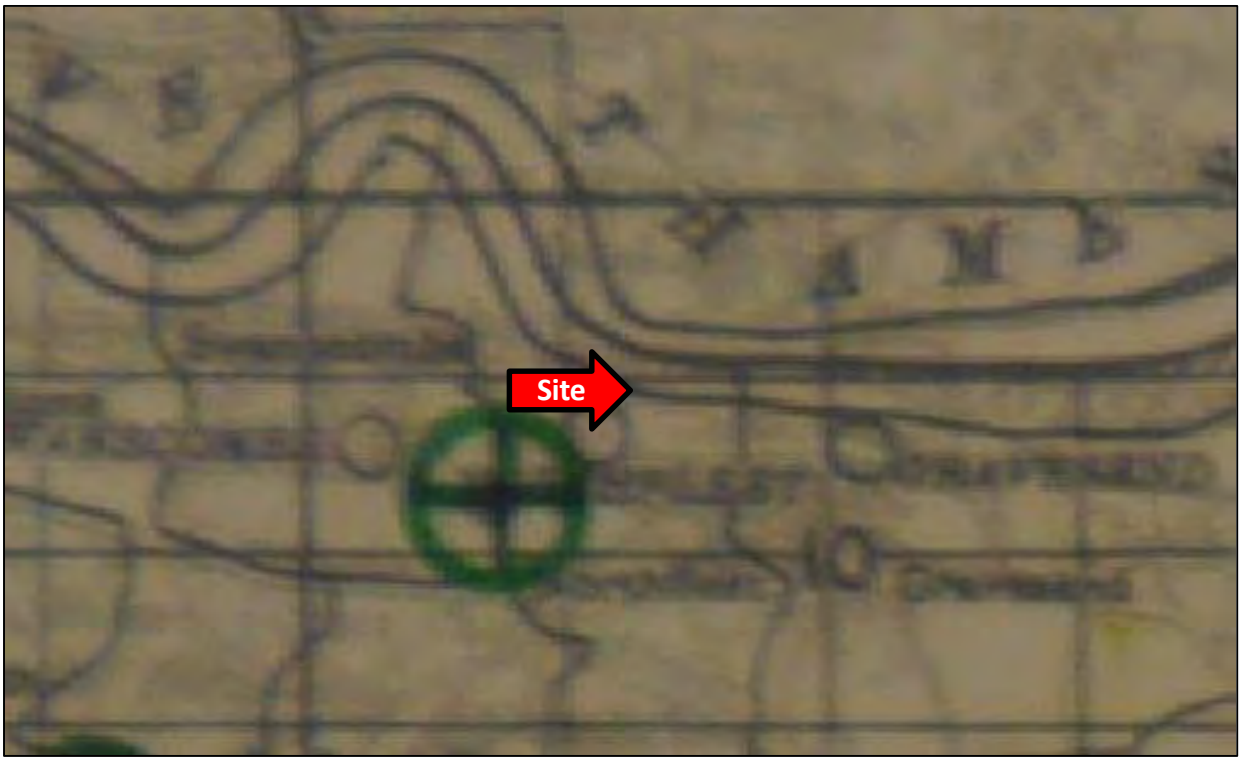
V-1 and Shells Daily Bomb Census Map

Annex: **K**

19th July 1944



Recorded V-1 bomb strike

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Tel: +44 (0)1992 245 020

Client: **GVR Geoservices Ltd**

Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00**

Source: Kent History and Library Centre

N

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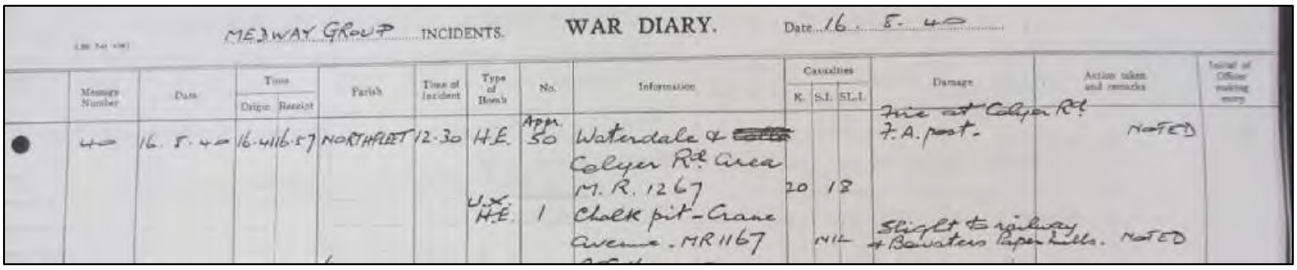
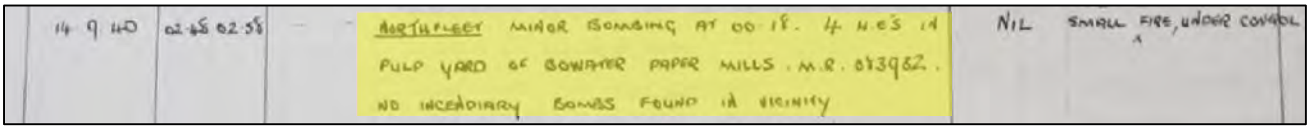
16th August 1940



MEDWAY GROUP INCIDENTS. WAR DIARY. Date 16. 8. 40

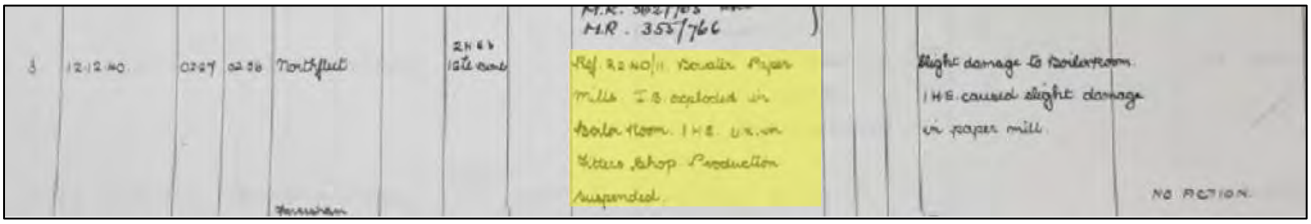
Message Number	Date	Time Origin	Time Receipt	Parish	Time of Incident	Type of Bomb	No.	Information	K.	S.I.	SL.I.	Damage	Action taken and remarks
40	16. 8. 40	16.41	16.57	NORTHFLEET	12.30	H.E.	Appr. 50	Waterdale & Colyer Rd Area M.R. 1267	20	18		Fire at Colyer Rd F.A. post.	NOTED
						U.X. H.E.	1	Chalk pit - Crane Avenue. MR1167		NIL		Slight to railway & Bowaters Paper Mills.	NOTED

4th September 1940



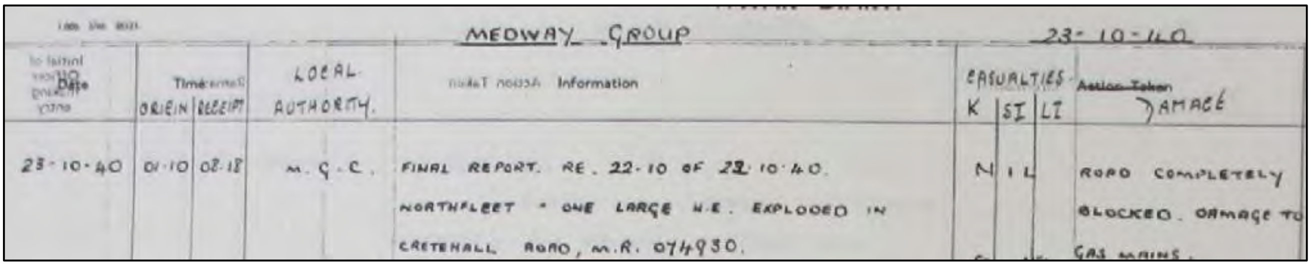
14 9 40	02.45	02.58	NORTHFLEET MINOR BOMBING AT 00.18. 4 H.E'S IN PULP YARD OF BOWATER PAPER MILLS. M.R. 073982. NO INCENDIARY BOMBS FOUND IN VICINITY	NIL	SMALL FIRE, UNDER CONTROL

12th December 1940



3	12.12.40	0247	02.56	Northfleet	2 H.E.s 1 Oil Bomb	Ref. R2 NO/11 Bowater Paper Mills. 1 B exploded in Boiler Room. 1 H.E. U.X. in Fitters Shop. Production suspended.	Slight damage to Boiler room. 1 H.E. caused slight damage in paper mill.	NO ACTION.

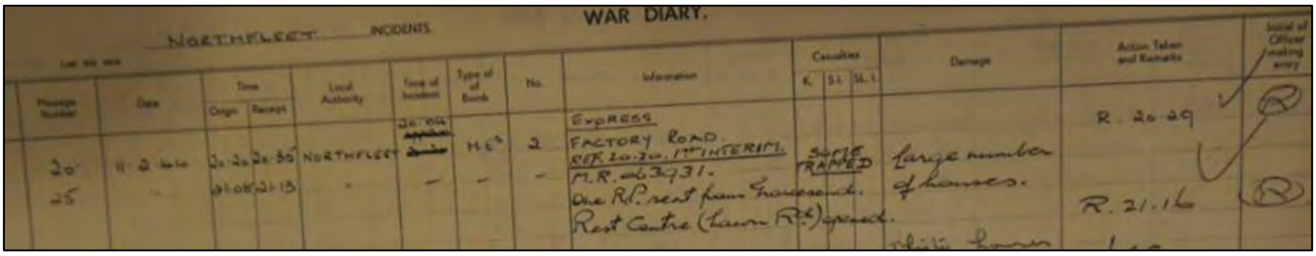
23rd October 1940



MEDWAY GROUP 23-10-40

Date	Time Origin	Time Receipt	Local Authority	Information	K	SI	LI	Damage
23.10.40	01.10	02.18	M.G.C.	FINAL REPORT. RE. 22.10 OF 22.10.40. NORTHFLEET - ONE LARGE H.E. EXPLODED IN CRETEHALL ROAD, M.R. 074930.	N	I	L	ROAD COMPLETELY BLOCKED. DAMAGE TO GAS MAINS.

11th February 1944



NORTHFLEET INCIDENTS. WAR DIARY.

Message Number	Date	Time Origin	Time Receipt	Local Authority	Time of Incident	Type of Bomb	No.	Information	Casualties	Damage	Action Taken and Remarks
20 / 25	11.2.44	20.20 / 21.08	20.35 / 21.15	NORTHFLEET	20.04	HE's	2	Express Factory Road. Ref. 20.20, 1st INTERIM. M.R. 063931. One R.P. sent from Gravesend. Rest Centre (Lawn Rd) opened.	SOME TRAPPED	Large number of houses.	R. 20.29 / R. 21.16

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RAF Aerial Photography 18th April 1944

Annex: **M1**

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Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00**

Source: National Monuments Record Office (Historic England)

Approximate site boundary

N

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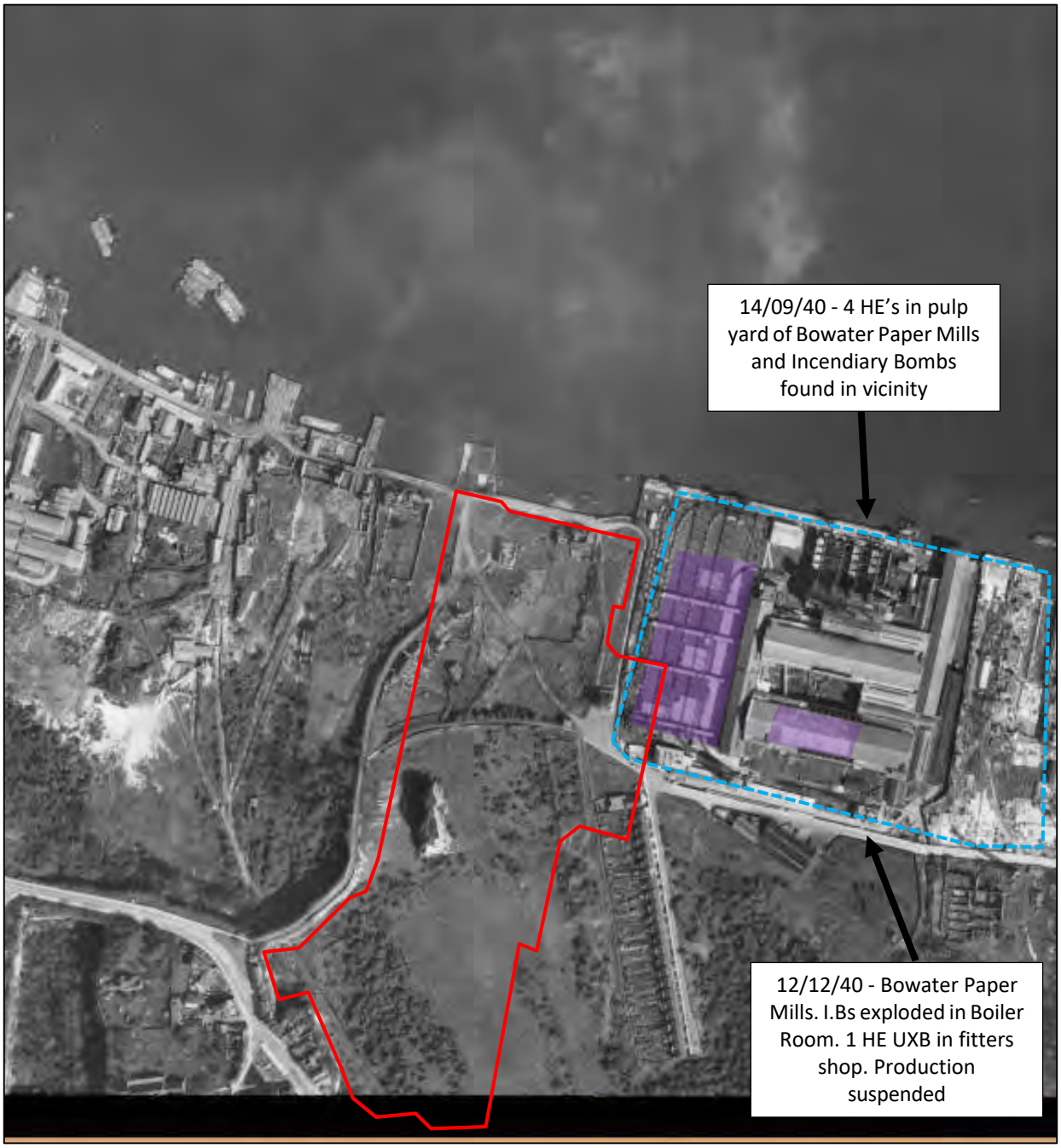
RAF Aerial Photography 18th April 1944 – Damage Overlay

Annex: **M2**


14/09/40 - 4 HE's in pulp yard of Bowater Paper Mills and Incendiary Bombs found in vicinity
12/12/40 - Bowater Paper Mills. I.Bs exploded in Boiler Room. 1 HE UXB in fitters shop. Production suspended

Visible Repairs to Damaged Roofing.

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Approximate site boundary

Project: **Northfleet, Gravesend, Kent**

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Source: National Monuments Record Office (Historic England)

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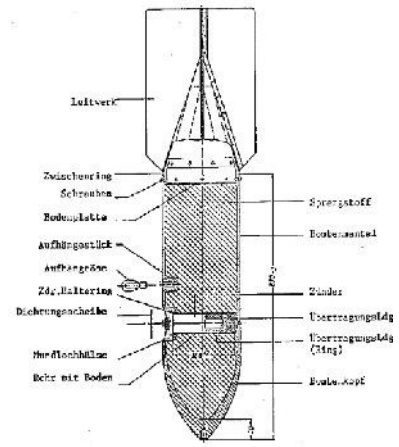
Examples of German Aerial-Delivered Ordnance

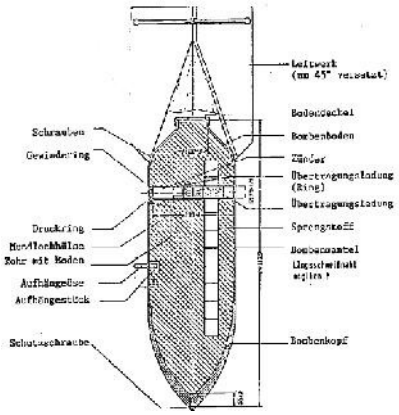
SC 50kg High Explosive Bomb

Bomb Weight	40-54kg (88-119lb)
Explosive Weight	25kg (55lb)
Fuze Type	Impact fuze/electro-mechanical time delay fuze
Bomb Dimensions	1,090 x 280mm (42.9 x 11.0in)
Body Diameter	200mm (7.87in)
Use	Against lightly damageable materials, hangars, railway rolling stock, ammunition depots, light bridges and buildings up to three stories.
Remarks	The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.



SC 250kg High Explosive Bomb

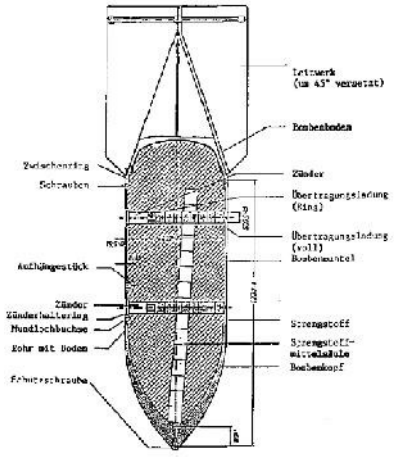
Bomb Weight	245-256kg (540-564lb)
Explosive Weight	125-130kg (276-287lb)
Fuze Type	Electrical impact/mechanical time delay fuze
Bomb Dimensions	1640 x 512mm (64.57 x 20.16in)
Body Diameter	368mm (14.5in)
Use	Against railway installations, embankments, flyovers, underpasses, large buildings and below-ground installations.
Remarks	It could be carried by almost all German bomber aircraft and was used to notable effect by the Junkers Ju-87 Stuka (*Sturzkampfflugzeug*, or dive-bomber).

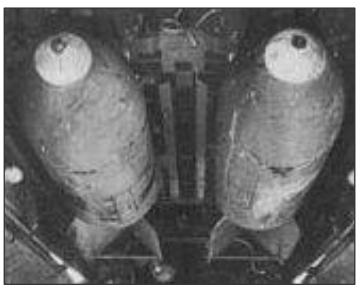


SC250 bomb being loaded onto German bomber

SC 500kg High Explosive Bomb

Bomb Weight	480-520kg (1,058-1,146lb)
Explosive Weight	250-260kg (551-573lb)
Fuze Type	Electrical impact/mechanical time delay fuze
Bomb Dimensions	1957 x 640mm (77 x 25.2in)
Body Diameter	470mm (18.5in)
Use	Against fixed airfield installations, hangars, assembly halls, flyovers, underpasses, high-rise buildings and below-ground installations.
Remarks	40/60 or 50/50 Amatol TNT, Trialene. Bombs recovered with Trialen filling have cylindrical paper-wrapped pellets, 1-15/16in. in length and diameter.





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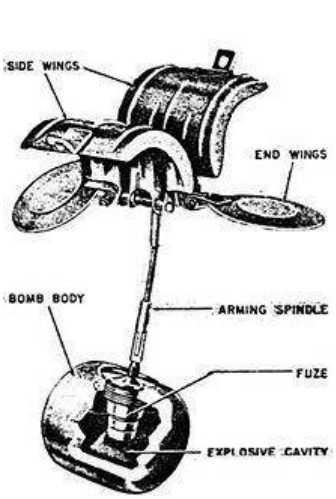
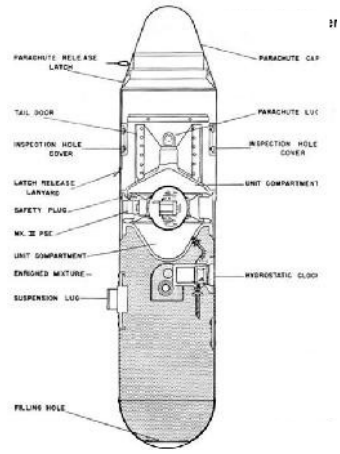
SD2 Anti-Personnel 'Butterfly Bomb'

Bomb Weight	Approx. 2kg (4.41lb)
Explosive Weight	Approx. 7.5oz (225 grams) of Amatol surrounded by a layer of bituminous composition.
Fuze Type	41 fuze (time) , 67 fuze (clockwork time delay) or 70 fuze (anti-handling device)
Body Diameter	3in (7.62 cm) diameter, 3.1in (7.874) long
Use	Designed as an anti-personnel/fragmentation weapon. They were delivered by air, being dropped in containers of 23-144 sub-munitions that opened at a predetermined height, thus scattering the bombs.
Remarks	Quite rare. First used against Ipswich in 1940, but were also dropped on Kingston upon Hull, Grimsby and Cleethorpes in June 1943, amongst various other targets in UK. As the bombs fell the outer case flicked open via springs which caused four light metal drogues with a protruding 5 inch steel cable to deploy in the form of a parachute & wind vane, which armed the device as it span.



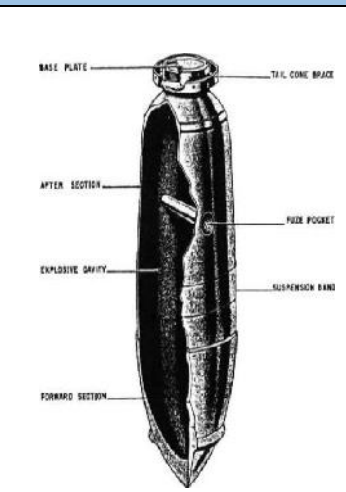
Parachute Mine (Luftmine B / LMB)

Bomb Weight	Approx. 990kg (2176lb)
Explosive Weight	Approx. 705kg (1,554lb)
Fuze Type	Impact/time delay/hydrostatic pressure fuze
Dimensions	2.64m x 0.64m (3.04m with parachute housing)
Use	Against civilian, military and industrial targets. Used as blast bombs and designed to detonate above ground level to maximise damage to a wider area.
Remarks	Deployed a parachute when dropped in order to control its descent. Had the potential to cause extensive damage within a 100m radius.



SC 1000kg

Bomb Weight	Approx. 993-1027kg (2,189-2,264lb)
Explosive Weight	Approx. 530-620kg (1168-1367lb)
Fuze Type	Electrical impact/mechanical time delay fuze.
Filling	Mixture of 40% amatol and 60% TNT, but when used as an anti-shipping bomb it was filled with Trialen 105, a mixture of 15% RDX, 70% TNT and 15% aluminium powder.
Bomb Dimensions	2800 x 654mm (110 x 25.8in)
Body Diameter	654mm (18.5in)
Use	SC-type bombs were General Purpose Bombs used primarily for general demolition work. Constructed of parallel walls with comparatively heavy noses, they are usually of three-piece welded construction.



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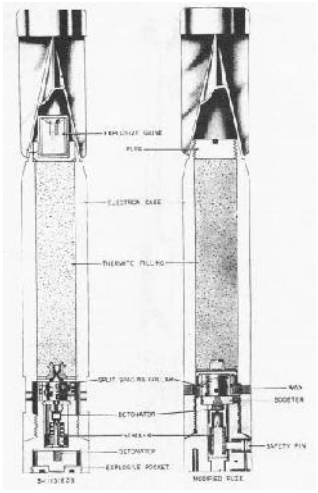
Examples of German Incendiary Bombs

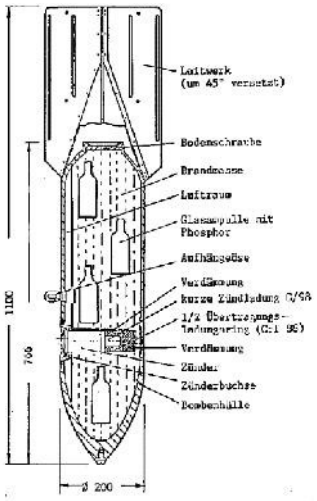
1kg Incendiary Bomb

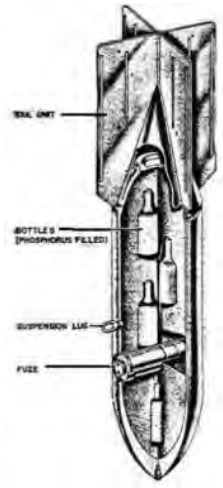
Bomb Weight	Approx. 1.0 - 1.3kg (2.2 and 2.9lb)
Explosive Weight	Approx. 680g (1.5lb) Thermite 8-15gm Explosive Nitropenta
Fuze Type	Impact fuze
Bomb Dimensions	350 x 50mm (13.8 x 1.97in)
Body Diameter	50mm (1.97in)
Use	As incendiary – dropped in clusters on towns and industrial complexes.
Remarks	Magnesium alloy case. Sometimes fitted with high explosive charge. The body is a cylindrical alloy casting threaded internally at the nose to receive the fuze holder and fuze.



C50 A Incendiary Bomb

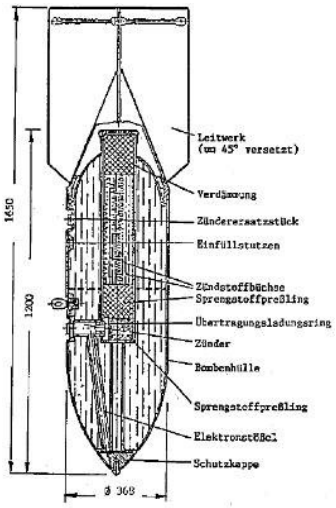
Bomb Weight	Approx. 41kg (90.4lb)
Explosive Weight	Approx. 0.03kg (0.066lb)
Incendiary Filling	12kg (25.5lb) liquid filling with phosphor igniters in glass phials. Benzine 85%; Phosphorus 4%; Pure Rubber 10%
Fuze Type	Electrical impact fuze
Bomb Dimensions	1,100 x 280mm (43.2 x 8in)
Use	Against any targets where an incendiary effect is required.
Remarks	Early fill was a phosphorous/carbon disulphide incendiary mixture.





Flam C-250 Oil Bomb

Bomb Weight	Approx. 125kg (276lb)
Explosive Weight	Approx. 1kg (2.2lb)
Fuze Type	Super-fast electrical impact fuze
Filling	Mixture of 30% petrol and 70% crude oil
Bomb Dimensions	1,650 x 512.2mm (65 x 20.2in)
Body Diameter	368mm (14.5in)
Use	Often used for surprise attacks on ground troops, against troop barracks and industrial installations. Thin casing – not designed for ground penetration.



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Project: **Northfleet, Gravesend, Kent**

Ref: **DA11104a-00**

Source: Various sources

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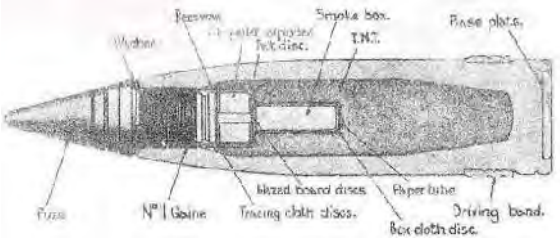
Examples of Anti-Aircraft Projectiles

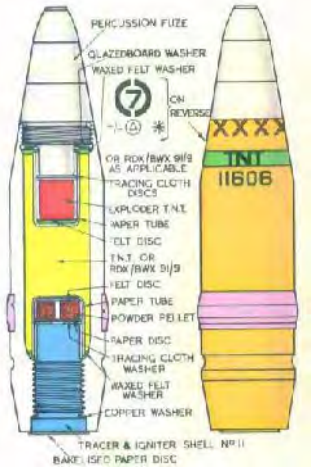
3.7 Inch QF Anti-Aircraft Projectile

Projectile Weight	28lb (12.6 kg)
Explosive Weight	2.52lbs
Fuze Type	Mechanical Time Fuze
Dimensions	3.7in x 14.7in (94mm x 360mm)
Rate of Fire	10 to 20 rounds per minute
Use	The 3.7in AA Mks 1-3 were the standard Heavy Anti-Aircraft guns of the British Army and were commonly used on the Home Front.
Ceiling	30,000ft to 59,000ft



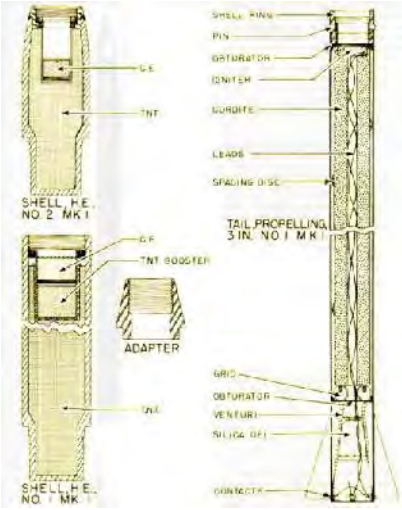
40mm Bofors Projectile

Projectile Weight	1.96lb (0.86kg)
Explosive Weight	300g (0.6lb)
Fuze Type	Impact Fuze
Rate of Fire	120 rounds per minute
Projectile Dimensions	40 x 180mm
Ceiling	23,000ft (7000m)
Remarks	Light quick fire high explosive anti-aircraft projectile. Each projectile fitted with small tracer element. If no target hit, shell would explode when tracer burnt out. Designed to engage aircraft flying below 2,000ft.



3in Unrotated Projectile (UP) Anti-Aircraft Rocket ("Z" Battery)

HE Projectile Weight	3.4kg (7.6lb)
Explosive Weight	0.96kg (2.13lb)
Filling	High Explosive – TNT. Fitted with aerial burst fuzing
Dimensions of projectile	236 x 83mm (9.29 x 3.25in)
Remarks	As a short range rocket-firing anti-aircraft weapon developed for the Royal Navy. It was used extensively by British ships during the early days of World War II. The UP was also used in ground-based single and 128-round launchers known as Z Batteries. Shell consists of a steel cylinder reduced in diameter at the base and threaded externally to screw into the shell ring of the rocket motor.



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Appendix E

Walkover Survey Photographs

1. Boiler House Looking NW.

2. Boiler House Looking NW showing staining at base of blockwork wall.

3. Boiler House Looking E showing one of the former sunken storage tank bases (former gas oil for the boiler house). The boiler house is now fired by natural gas.

4. Effluent Treatment Plant and Water Tower.

5. Effluent Treatment Plant Looking E.

6. Effluent Treatment Plant Looking SE.

7. Storage tanks in southern area looking SE.

8. Water storage tank in southern area looking E.

9. Proposed Development Area Looking W, south of the Boiler House.

10. Proposed Development Area Looking S towards Effluent Treatment Plant.